



NEWS IN BRIEF

Fun day at BCS 79

A SATURDAY of fun and education for children is a feature of a three-day conference to be held by the specialist groups of the British Computer Society in London from January 4 to 6.

Called BCS 79, Living with Computing, the event will include 18 presentations from BCS groups including computer arts, programming, languages, medical applications and word processing. Three-day tickets cost £25 for BCS members and £50 for non-members, with reductions if booked before August 31.

Saturday-only tickets are at a bargain £1 for adults and 50p for children. For further information contact BCS 79 conference office, BCS, 29 Portland Place, London, W1N 4HU.

Future of telecoms

THE future of Post Office Telecommunications is to be the subject of the first event from the Information Systems of Chorley Wood, Herts, a new conference-organising company formed last month by Al Dunn, Neil James and Roger Barnes, who previously worked for Online Conferences. The Post Office conference will be held in London on September 25 and 26.

DEC also range

THREE new disc drives introduced by Digital Equipment range in price from £2,500 to £15,100. The smallest is the RLO1, a 5.2 Mbyte system for PDP-11/04 to VAX-11/780 systems there is the 28 Mbyte RPK07, and for the top end PDP-11/70 and VAX-11/780, there is the 67 Mbyte RMO2.

College picks 2903

THE Lincoln College of Technology is to install a £34,000 ICL 2903 computer system this month. It will be used for batch processing and interactive program development on eight terminals by 6,000 students from the college and local schools.

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COMPUTER WEEKLY

Samet hits at bizarre financing

SHORTAGE of accommodation is presenting a major difficulty to University College, London, over its installation of a new computer system, according to Professor Paul Samet, director of the computer centre, who places the blame on the "bizarre" way university computing is financed. The college has received approval to buy a system of GEC minicomputers (CW, September 1, 1977) to replace its ageing IBM 360/65, but has nowhere to put the new hardware during a changeover period.

The difficulty, according to Samet, is that although the

computer hardware is paid for by the Computer Board, accommodation has to be provided by the University Grants Committee, which will not even approve the planning of new accommodation until the equipment purchase has been passed by the Computer Board.

The UGC has still not taken steps to provide space for the GEC machines, which were ordered some months ago, says Samet. If the college has to provide accommodation this will involve additional expense, and the withdrawal from service of the 360 will be greatly delayed.

Samet complains that the Computer Board has a stated intention of replacing machines on a 10 year cycle, but did not even approve the initiation of a replacement programme until UCL's machine had been running for over 10 years.

The college is talking to Cambridge and Newcastle Universities, to arrange for them to join Metronet, the network that links all the London University computers. This would provide access to an IBM service for UCL users after the 360/65 is removed. The other two universities are in favour of this.



Paul Samet - no planning allowed to accommodate mini system.

NCR men vote on strike

FOLLOWING a breakdown in talks between NCR and its last month over new pay terms and salary scale, the company's 1,500 employees in the UK are expected to go on strike.

Teaching system

A NEW operating system educational purposes, the 2903 computer has been bought by ICL and North London Polytechnic.

Called Minimax, it provides simultaneous batch and online access to terminals. A powerful tool for entering job control statements from the terminal is available to all the users.

ICL's library of 2903 programs and all the programming languages are available to the terminals. With Minimax and the 2903, users can do about £40,000.

US army \$7m

UNDER a four-year contract worth \$7 million, the US Army Corps of Engineers has awarded a contract to the US Army Corps of Engineers.

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Briefing IBM goes into Orbit

BY the end of the year, IBM is expected to announce two major new products, the Orbit distributed processing 32-bit mini, and the small to medium replacements for the 370, the E-series.

Orbit is designed as a 3790 replacement for distributed processing applications and will be about as powerful as a Digital Equipment PDP-11/70. The E-series, which was originally scheduled for announcement earlier this year (CW, March 30), is now expected in the fourth quarter of 1978.

Ventek debut

COMMON hardware and software modules, including existing Datapoint systems, are the basis of Ventek's new distributed processing architecture, described by the company as Attached Resource Computer systems.

First 16K Prom

WHAT is believed to be the first 16K PROM in the world to go into production has been announced by Signetics. It is available in sample quantities now and will be available in volume by next year. Technical features include a typical access time of 80 nanoseconds and a maximum power dissipation of 925 milliwatts.

Software contract

AN online commodities trading system is to be developed by Software Architects under a £80,000 contract from Perkins Elmer Data Systems. The system, for London metal merchants Brandeis Goldschmidt, will run on an Interdata 7/32 with 256K of memory, using Cobol and the Itrac transaction processing monitor.

UCSL choice

MACHINES from Intel and AMD's as well as IBM are being considered by Unilever Computer Services Ltd as replacements for two 380/65 systems at its Watford centre. A decision is expected in the next few months. UCSL already has an Intel AS/6 at its Burgess Hill centre.

Euro distributor

A EUROPEAN distributor for the IBM compatible M80 computers built in the US by Magneton Systems (CW, June 1), is expected to be announced within the next few weeks. It will be a well-established company in the computer business that already operates in most of Europe, according to Magneton.

World finals

OFFICIAL sponsor of the US badminton team which competed for the Uber Cup, badminton's equivalent of the Davis Cup in tennis, ICL contributed about £8,000 towards the expenses of the non-professional players in the world final in Auckland, New Zealand.

COMPUTER WEEKLY

Number 604 Thursday, June 8, 1978 Price 18p



Four of the judges of Computerstyle 2000. They are (left to right): Computer Weekly editor Malcolm Peltu, director of the National Computing Centre David Firth, the technology correspondent of The Guardian Peter Large, and Gaskit managing director Tim Holley. The fifth judge, William Woolford, of BACTV's Tomorrow's World, was filming in Germany during this judging session.

IPC buys Systems International

THE monthly journal, Systems International, has been purchased by IPC Business Press, publishers of Computer Weekly, for a total sum of about £450,000.

The present editor and sales manager of Systems, Frank Ruddy and Guy Pearce respectively, will continue in the current functions and the first issue of Systems International under IPC Business Press control will be this month's issue.

Publishing director of Systems International will be Christopher Hipwell. IPC Business Press has bought the entire issued share capital of the previous publishers of Systems, Gerhardt Ltd, for £400,000 plus a sum equal to the net asset value of the company, which is expected to be about £50,000.

Peter Yapp, managing director of Electrical-Electronic Press division of IPC Business Press, which will have responsibility for Systems International, said that the newly acquired publication "is a healthy and welcome addition to our company, strengthening our already well-established position in the market for existing in very well alongside our other journals such as Computer Weekly, Computer Products International, Electronics Weekly, Electron, and Data Processing.

Sleek tracking of oil at sea

SOFTWARE for predicting the spread of oil at sea has been acquired by BP's bureau subsidiary Selcon. The system, Sliktrak, will be used to provide two types of service: forecasting the spread of oil from an accident; and pinpointing when and where oil was dumped.

COMPUTER WEEKLY'S INSIDE NEWS

THERE may not be many of them, but the women in the UK computer industry have made their mark. Christine Harvey takes a look at some of the success stories (pages 22/23).

The continuing shortage of skilled and experienced computer staff could result in a "brain drain" from the industry, says a survey by SIS Applied Systems analyses the rewards of top DP people and the fringe benefits that ease their lot (page 34).

Personal computing has come to the aid of a disabled ex-serviceman who has been bedridden for 10 years. It has opened new horizons to him and he may even be able to get a job again (page 12).

The Panther has revisited India to see how computing has developed since he was last there four years ago. The computer population is still sparse and there is tight government control, but he considers the prospects to be bright (page 20).

The vital role of standards

Malcolm Peltu reports from the NCC at Anaheim

SOFTWARE standards enforced by governments, and the crucial role of computing in helping to solve the worldwide energy crisis, are emerging as top priorities in the development of the US government's strategy towards information technology. In a keynote speech that opened the National Computing Conference at Anaheim, California, this week, leading US Senator Fritz Hollings said that President Carter was failing to give any coherent direction to the information technology revolution which, he said, was "America's newest and most important frontier".

But in another speech at the opening session, Dr Joel Snow, associate director of research in the US Department of Energy, said that in the energy field at least computers were seen as an intrinsic part of government policy.

Senator Hollings, who is chairman of the Senate subcommittee on communications and a member of this subcommittee on science concerned with standards, said that the

implications of improving standardisation would be enormous in terms of lower software costs and the stimulation of computer industry growth. "Under Congressional and Presidential prodding," he said, "additional funding has been made available to the US National Bureau of Standards to develop a five-year plan aimed at achieving much closer links

among the many interesting items on display at over 1,400 booths at this week's National Computing Conference in Anaheim, were a portable radio data entry terminal from Motorola, a new Intel 16-bit microprocessor family, a 32-bit time sharing system from BTL Computer Systems and new products from Pertec and Centronics.

And on Monday, as the conference opened, Honeywell announced a \$20 million order for the new Level 6-23 mini from the Brunel Recreation Group, for use by bowling alley operators.

The new Motorola RDX 1000 portable data terminal is a hand-held device weighing under two pounds which incorporates a keyboard and a small screen.

The new system could be constructed using the technique that ICL calls cross coupling. This involves taking components from different existing machines to create a new model.

People in the news
Daisy dates
Dataplex collapses
Computer-produced art
Letters to the Editor
Micro news
Tough life on standards
Op Spot
Computerstyle 2000 winner
Collage for managers
Microforum 78 preview
Meeting needs of banks
When your data network
collapses
Standardised distribution
The Sales Mix
The Top 100
Birthday Honours

Computerstyle 2000 top prizes shared

TOP prizes in the Dataskil/Computer Weekly competition, Computerstyle 2000, have been shared by Bryn Jones of Haverfordwest, Pembrokeshire, and consultant David Butler, of Butler, Cox and Partners.

Each will receive £150 as a share of the first two awards, which had originally been specified as £200 for the first prize and £100 for the runner-up. The third prize of £75 was won by John Garrett of CST. Computer Weekly is also making special awards of £25 each to three entries which had particular originality, although the judges decided they did not come in the first three.

The special awards go to John Finnie of GKN Group Management Services in Solihull, Paul Holden of Applied Management Systems in Dublin, and A. Thornton of British Rail in Derby.

All the award winners will be published in Computer Weekly, starting this week with the winners from Bryn Jones.

Reference between Builders because their entries were in a "look back" in a history book... in the year 2000, and Jones in story form.

The judges felt that, on the whole, the entries were competent rather than brilliant, with many interesting ideas but few that were unexpected. The picture built up of lifestyles in 20 years' time were mainly along the lines that have been covered over the past year in Computer Weekly, with a generally optimistic view that the dangers of a neo-Luddite backlash against information technology will be overcome.

The competition asked for essays on the likely impact on home and work styles that computers might have by the year 2000.

● Turn to page 3

Council orders first new model in 2900 range

A MEDIUM to large scale addition to the 2900 range is due to be announced by ICL this week and Oxfordshire County Council looks like being the first customer.

Oxfordshire has 1804S at the moment but a spokesman told Computer Weekly that a much more powerful system was needed to meet the authority's future data processing needs.

The spokesman was unable to give any details of the system that ICL has lined up for Oxfordshire, but suggested that it would be in the 2970 performance area.

The new system could be constructed using the technique that ICL calls cross coupling. This involves taking components from different existing machines to create a new model.

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JOBS—PAGES 21-27, 35-62

ONLY time will tell whether the National Enterprise Board is remarkably astute or a suitable candidate for gamblers' anonymity.

NEB takes a bold gamble

European expatriates that it employs.

They have been happy to be hunted generally, not only because of the salary, but also because of the attendant benefits packages, such as share options and profit shares that make up a goodly "piece of the action".

Such deals have become the standard mode of operation in the semiconductor industry, and the fact that the NEB has entered the fray with an offer of this type to the group of British and American engineers that will make up the new company, is one of the more interesting aspects of the whole venture.

Other individuals in other industries must be viewing this development with interest.

Certainly, the NEB's guidelines give it a fair degree of commercial and financial freedom, only requiring consultation with the Secretary of State for Industry when an investment of over £10 million is involved. But for a UK government agency to offer risk capital plus a share option to a group of individuals is probably unique.

It also reinforces the point made recently in Computer-View that the Tory attitude to the NEB as expressed by Sir Keith Joseph (CW, April 27) is

wrong because it threatens to stifle the Board's profitable ventures before they are given a chance to succeed.

Whatever the final outcome, and an assessment of the problems the company will face appears in Micro News (page 15), the government is to be applauded for grabbing the bull by the horns. It is a move that complements the efforts of the Department of Industry's plans for selective support of the more specialised UK semiconductor industry.

With the right people running it, and the right degree of freedom from the NEB, it is possible to visualise the plan working. To enter the all-important domestic American market, on which the venture will basically succeed or fail, the company will need to move fast, and get its production and design right first time.

The odds, however, are not all against it.

Bradford council rejects ICL tender

DESPITE a last-minute bid by ICL to win the tender, Bradford Metropolitan Council is to switch from its ICL 1904A to a Honeywell Level 66 DPS 110.

Bradford council officials have alleged that after tenders were received from ICL for a dual 2800 system, Honeywell for the Level 66, and IBM for a 3031, a letter was sent from ICL, cutting the company's bid by £282,000.

However, after evaluating running and associated costs for the systems over a ten-year period, council leader John Singleton said that the Honeywell system would, at almost £3 million, still be about £180,000 cheaper than the ICL system. The Level 66 system will be used by Bradford Metropolitan Council to handle rents and rates, and general accounting as well as providing processing power for computer science classes in local schools.

Bradford Council clashed with ICL last year when it refused to pay ICL the compensatory level that ICL demands when a user

installs add-on memory from an independent supplier (CW, June 21). In Bradford's case this was Systems Reliability.

Bradford and ICL have not come to any agreement about the levy and as yet Bradford has paid nothing to ICL. However, a Bradford spokesman said that the levy affair had not influenced the council's decision to change its mainframe supplier to Honeywell. The main reason was that Honeywell offered the best value for money.

The other ICL user to challenge ICL, head-on over the levy, the Norwich Union Insurance Group, decided to change its mainframe supplier to IBM about six months ago (CW, January 12).

ICL has not lost out completely at Bradford because the council has just ordered a 2800 and a 2904. The 2903 will be used by the local court for scheduling pre-court schedules and recording fines, while the 2904 will be installed at Bradford College. It will be used by all the colleges in the Bradford area.

NRDC blamed for inventors' failures

A SWINGING attack on the National Research and Development Corporation has been made on television by John McNulty, managing director of Modulin Telematics.

The programme, on May 30, was Man Alive Report on inventors and how many of them in this country fail to achieve success despite their talent and hard work.

A film report was followed by a studio discussion among a group that included several inventors, a stockbroker, the technical director of Philips Industries, Roland Rosser of the NRDC, and John McNulty.

Referring to the NRDC, McNulty said that any government manoeuvres around a new



On winner with Denise

Our Page 56 girl Denise Perry who was involved in a Grand National prediction earlier this year (CW, April 8), has been to the races again, this time to help BOC Telecom to find the Derby winner. The "race" was run on Datasolve's ICL 2870 at Sunbury on Thames, and the result was printed out in Amsterdam last week at a cocktail party for delegates to the 2800 Club meeting.

Denise (above) handed out prizes to those who had forecast the winners of the "Sunbury Derby". The result may have been different from yesterday's Epsom classic, but the printers in Amsterdam enjoyed the form on show there.

In a re-run of the program earlier this week with the declared runners for the Derby, the 2870 came up with this result. Formidable, at 14/1 by half a length from Inkerman, 6/1, with Admiral's Lagoon, 11/1 third. Perhaps next year we can get the "result" to you before the event.

Come and join in the London fun

NEXT Sunday Computastars comes to London when the South of the Thames heat takes place at Croydon Sports Arena, Arbat Road, South Norwood, starting at 10 am. It'll be a good day out for the family, so why not come along and support the DP people who will be competing for a place in the final?

And if you can help out with refereeing

some of the events or are willing to give a hand as a marshal, organiser Gordon Cairns will be pleased to hear from you on 01-828 5366. Don't forget the date Sunday, June 11.

For the ethnic types who are North of the Thames their heat is to be held at Willenden Stadium, Donnington Road, Willenden, on Sunday, June 18, at 10 am.

Subsequent heats are: North West — Kirby Sports Centre, Liverpool, Sunday, June 25, starting at 10.30; and the Midlands — Alexander Stadium, Perry Park, Birmingham, Sunday, July 9, starting at noon.

Computastars is organised by John Goldsmith Computer Services with the support of Computer Weekly.



Online data entry to save PO £22m

A MASSIVE online data entry system called TOLD, Telecommunications On-Line Data, has been put into operation by the Post Office with the aim of saving about £22 million in time and paperwork.

TOLD involves 1300 Raytheon Coscor display terminals at more than 100 telephone offices all over the country linked online to ICL System 4-72 mainframes at Leeds and at Harmondsworth, near Heathrow. These are the machines that already run LACES, London Airport Cargo

computer centres for processing.

The 12 centre handle payroll for 250,000 Post Office staff, prepare 60 million phone bills a year and compile nearly 25 million directory entries a year.

The computers at Leeds and Harmondsworth are linked to six of the centres via a network called ICON, inter computer centre network, which involves two ICL 7805 communications processors linked to six ICL 7903 satellite processors.

The TOLD system runs under the Post Office's Monitor

operating system which is also used for LACES and for the RAF

Hendon stores control project. TOLD was programmed in the Usercode assembler language and about 12% of the program lines are calls to macros which are used by the compiler to generate 80% of the object code.

The TOLD online program library consists of 580 modules with about 500,000 generated lines of machine code. Each 4-72 running the system can handle a peak message rate of eight transactions a second.

Bank union seeking support to start survey on salaries

FOLLOWING the rejection of its bid to gain access to computer pay figures prepared by Computer Economics for the Joint Credit Card Co, the National Union of Bank Employees is now seeking support from other unions and the TUC to start an independent trade union survey on computer salaries and conditions of service.

NUBE's bid was rejected by the Central Arbitration Committee which ruled that the Computer Economics survey was private and confidential. It

said the credit company, which administers Access credit cards, did not have to disclose to the union the information contained in the report.

The information was needed to act as a basis in pay negotiations, said NUBE. Terry Molloy, assistant secretary of the union, said the decision of the CAC meant that "we will no longer be willing to accept that the CAC figures should be used as a basis for negotiating computer staffs' salaries in banking and in the Joint Credit Co."

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COMPUTER WEEKLY

Vol. 24 No. 604

Thursday, June 8, 1978

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New York: 225 East 42nd Street, New
York, NY 10017. Telephone (212) 607-2000 Telex 421712
Subsidiary wholly owned by
Registered at the Post Office as a
newspaper. Price per copy 15p

Computer Weekly is not free of charge to the following categories in the UK and Channel Islands: Government departments, universities, research establishments, company secretaries, management consultants, accountants, solicitors, barristers, engineers, architects, surveyors, estate agents, insurance companies, banks, building societies, stock exchanges, and other financial institutions. Outside the UK and Channel Islands the above categories are charged the same as the general public. Single copies 15p. Subscriptions: 12 issues for £10.00. Single copies 15p. Normal rates on request.

Advertisements: 100 Business Press (Print & Distribution) Ltd, 40 Bedford Square, London WC1R 4EJ. Tel: 01-837 3888. Subscriptions: 100 Business Press (Print & Distribution) Ltd, 40 Bedford Square, London WC1R 4EJ. Tel: 01-837 3888.

Each issue contains a list of all the products and services available for sale or hire. Computer Weekly has a circulation of over 42,000 including the highest fully referenced circulation in the UK. The international edition, which is published 10 times a year, has a circulation of over 64,000.

ISSN 0010-4787

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Ten years ago...

COMPUTER WEEKLY
JUNE 6, 1968.

EDUCATION and Science Minister, Shirley Williams, admitted that there could be done under present legislation to control the operations of independent programming schools. Research work in biotechnology of the human body was being carried out at the Middlesex Hospital, London, with the aid of a time sharing terminal linked to a De La Rue Bull GE 285 system. The Football League was planning to use a KODAK computer to produce next season's fixture list. A London group of the Computer Education Branch of the BCS was formed. The Birmingham Group of over-employment at its computer centre for UK operations. The Department of Clinical Chemistry at Dundee Scottish centre to study the effects of anaesthesia on the brain.

OPEN DAY at the Laboratories was always a great day looked forward to by husbands, wives, children, mothers and fathers. The staff always worked hard to make the day a success, but even so enjoyed every minute of the preparations.

The Laboratories are the largest of their type in Europe and have a lot to show to an interested audience. Demonstrations were organised to portray to the visitor the various techniques used in the design and construction of computers. Rooms were set aside for presentations, film shows and talks. In the afternoon children's sports were organised on the adjacent sports field, and teas were served from the Club-house.

But this time was very special. The new computer room, housing three complete systems, was to be open to visitors, and demonstrations with "hands on" activities were to be arranged. Naturally with children around, many precautions had to be taken to prevent little fingers getting where they shouldn't. Operators were instructed to be constantly aware. Some areas were cordoned off to prevent injury, or damage to machines. There was no possible exposure.

There was an excellent attendance and the computer room proved most popular of all. Excited children keyed messages into terminals and waited breathlessly for replies, to flash up on the video screens. Parents were amazed at the speed of the printers. The machines hummed away with lights flashing, operators changing tapes, pressing buttons and conversation and laughter filled the background.

But, quite suddenly, the lights went out, the machines stopped, and conversation ceased; every-where was silent — the systems

had all gone down together! This had not happened before and could only mean one thing — a complete mains supply breakdown. The maintenance engineers were rushed to the scene and they soon found the cause. One of the yellow emergency buttons had been pressed. Nobody had given any attention to these buttons located at about six vantage points — nobody except, would you believe, a small inquisitive boy. He pressed the button and caused a major interrupt.

The moral: To be absolutely sure one has to be small-boy-proof rather than foolproof — or the simplest things can be the most important.

● This week's £5 prize goes to V. J. Pearson of Southampton.



McNulty inventors were usually the victims of death, in which Rosser responded by pointing out that the NRDC was a separate body from the government and had to show a return on capital employed. It was looking for now less all the time and was not full of red tape. The NRDC took risks and that was why half the projects that it backed failed.

Itel AS/5: the first year.

See page 13.

Portable radio

● From front page

poretes an alphanumeric keyboard, 16-character display and a 480-character memory. It is designed for use with IBM 360 and 370 mainframes offering most of the standard functions of the 3270 display terminal.

The system transmits radio frequency signals at 450 Megahertz line-of-sight over one to two miles. The price for a complete system with 10 terminals is \$80,000.

The Intel NC-36 microprocessor family includes the 8085 CPU which offers 10 times the performance of an 8080 and provides unusual micro capabilities

such as re-entrant program code and dynamic memory allocation.

The latest company to adopt the four-bit AMD 2801 bit slice micro as the basis of a 32-bit processor is BTI Computer Systems, formerly known as Basic Time Sharing. The BTI 8000 is modular and is built round a very fast 87 nanosecond bus, with an operating system designed for efficient running of language compilers written in Pascal. RTI has a London office and plans to launch the 8000 in Europe in 18 months.

Pertec launched the XL/20 data entry system which is built around a 16-bit microprocessor designed by Pertec and programmed in Cobol. It supports up to four terminals and handles IBM 2770, 2780, 3780 and HASP protocols, but is not yet available in the UK.

Centronic offered visitors a preview of its forthcoming 8800 low noise 900 lpm band printer which has a 64-character set.

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Ready, willing and able....

HERE, in quaint Olde England, we tend to think that everything in the US is too trendy and progressive to be true. In reality, many old-fashioned things prevail, not least the deep "Old Testament" type religious feeling.

This is why the Logical Machine Corp, Lomac, the firm that makes the "no software" system called Adam, is thinking twice about calling a bigger version of Adam currently on the stocks by the name they favour — Abel — Son of Adam, of course. This, despite the fact that the equally Biblical name Adam has been accepted with no fuss in the US.

Lomac is seriously considering changing round the last two letters so that the name sounds the same, but comes out as Able.

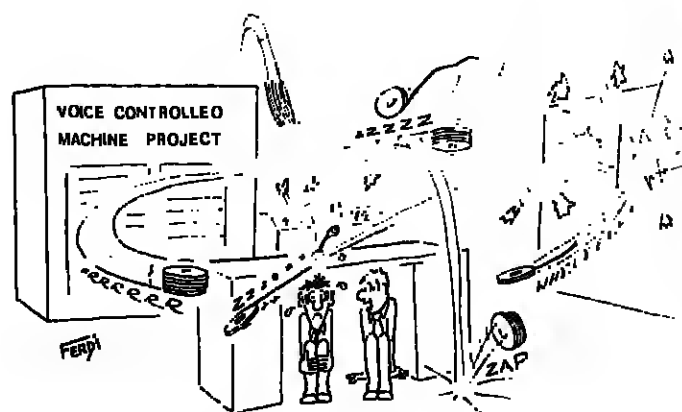
Problem is that Able is difficult for people in France and Germany, two of Lomac's biggest overseas markets, to pronounce, so the firm may compromise and call Abel Able in Europe.

I do hope you are able to understand all this.

Technology under the hammer

AS THE Renaults and Picassos disappear into the world's art galleries and private collections, the auction business is turning more and more to technology, or at least the early attempts at it — and is finding a surprisingly ready market.

Last week, Christies were entrusted with the task of



"We must assume it knows the meaning of the name you called it."

selling an old German Columbia typewriter. Its owner thought it was worth £20. Christies' experts estimated a sale price of between £200 and £300. The eventual sale price was £750.

And this was for a machine patented in 1885, with the simplest type of type-wheel, yet with the sophistication of

proportional spacing.

It makes me wonder what the current crop of word processing machines might fetch at Christies in 80 years' time.

I recently saw a classic in office equipment, an IBM Executive electric typewriter, knocked down at a Hitchin auction for £8.

Well, it's a start.

DOWNTIME by Chad

What's in a name?

ONE of the less pleasing aspects of the computer business is the way numbers are used by and large instead of names.

Logica's new word processor (CW, June 1) was known throughout its development as Rivet (Remote Input Video Editing Termini), but this turned out to be a ride word in Spanish, so the machine is now called VTS/100.

This problem of names having unwanted meanings in foreign languages is why many international companies give their products numbers only. The talk at Xerox's R&D centres is per-

peted with many colourful code-names, which are sadly dropped as soon as the machine goes on the market: Orlando, Agate, Decoy, Carol. The new years as Ardri but is now, possibly, the 0200.

We at CW are particularly sorry about the dropping of "Rivet," because Logica has hopes of selling some of these machines to the British Steel Corporation, one of their existing customers — and we could then have had a headline along the lines of "British Steel buys Rivet."

PETER HEWITT REPORTS ON THE FOURTH ANNUAL CONFERENCE OF THE NORTH AMERICAN DATAMANAGER USER GROUP

Users stress need for data management standards



Although the great majority of Datamanager users is based in North America, head of MSP David Gomes de Costa (pictured left) stated in response to a user's question that there is at the moment no intention to move the software development team from the UK to the US. Describing the long lead-time between initial

evaluation and eventual installation of the product, he predicted that current interest in Datamanager would lead to an approximate doubling of the user base over the next year. If the company's anticipations were confirmed, North American users would then number about 250, with about 80 users in Europe.

"DATAMANAGER is an excellent tool with which to implement installation standards, but you must devise standards first which could be implemented manually." Such was a typical view expressed at the fourth

national conference of the North American Datamanager User Group, held in Boston from May 17 to 19.

The meeting attracted about 100 users of MSP's data dictionary system, representing

some 73 installations out of a total of 123 which have installed the product in North America.

Those attending had widely varying experience of the system, ranging from a few weeks to nearly three years. As a result,

some were interested in developing advanced active uses for the dictionary while many were chiefly concerned to pick up tips on getting started.

In its most basic role, Datamanager acts as a repository for system documentation, holding, correlating, and disseminating information on fundamental system entities: systems, programs, files, groups, data items, and the relationships between them.

Even in this passive role, data dictionary systems are in a state of relative infancy and many users clearly feel that they are venturing into uncharted waters. The conference was for them a valuable opportunity to benefit from others' experience.

One immediate task for those installing a data dictionary is to decide on systematic naming conventions. Datamanager users worldwide have accumulated much valuable experience in this area, which was often returned to in open discussion periods.

One of the most colourful of the formal presentations also addressed this topic. Russ Stefany, of American Cyanamid, described his company's approach to the development of standard word abbreviations for use as "building blocks" in the creation of entity names.

This work had involved constructing a software tool which would generate abbreviations. Cyanamid's standard had dictated a maximum size of six characters, and one important aspect had been the elimination of synonyms.

The complete PR vocabulary which emerged from this project contained only 639 standard terms, including such forms as NU for number, PROD for product, and PCRG for package. The general rule had been to drop vowels, but for certain very common words, such as number, product, popular abbreviations were substituted.

Other topics of concern among those just starting were procedures to control updating of the dictionary and whether or not to document existing sys-

tems retrospectively.

On the latter question, some felt that the effort required, admittedly minimal, usually resulted in a dictionary of established items which would recur in new applications.

Others, pointing to the limited five-10 years life of most DP systems, felt that it was not worth taking on old data. These users preferred to use the dictionary only on new systems.

A compromise favoured by some was to restrict retrospective documentation to the level of systems, programs, and files — ignoring the details of individual data elements and groups.

Datamanager provides an automatic set-up facility, which creates a dictionary automatically from program source code; this feature can be used to load the dictionary with documentation on existing systems.

However it was pointed out that, with poorly-controlled naming standards in existing programs, the resulting dictionary is of little use. Many identical members would generally occur under different names, and identically-named members could actually refer to distinct entities. Thus automatic set-up does not avoid the need for basic research.

Some of the most interesting possibilities for data dictionary use are in active mode. Here, the information in the dictionary is used to drive application systems.

Many users, for example, already use the dictionary definitions to generate data structure source code for insertion in programs. At the moment, the dictionary is used mainly to load an intermediate copy library. Future developments may enable compilers to access the dictionary directly, generating and inserting appropriate source code at the time of compilation.

One large-scale Datamanager user, the Xerox Corporation, has written a Cobol pre-compiler designed around the recently released Access/Call feature. By accessing information in the

dictionary, this software is able to generate the first three divisions of a Cobol program automatically.

The pre-compiler is also used to enforce the Cobol programming standards adopted by Xerox, which has certain language constructs, and to format Procedure Division code in a standard way.

Another user, Charles Rauch, of Sperry and Hutchinson, described an interface built between Dnlmanager and the ASI-ST report writer.

The interface enabled Datamanager to build the internal dictionary used by ASI-ST, thus eliminating potential data redundancies and inconsistencies in the installation.

Sperry and Hutchinson also use Total and use the source language generation facility of Datamanager to produce both Total DBGEN data and Cobol copy library source. In this way, the dictionary, acting as the primary inventory of system data, also controls and synchronises the global use of data.

Also discussed were more futuristic applications of the dictionary. These would further extend the control exercised over user programs.

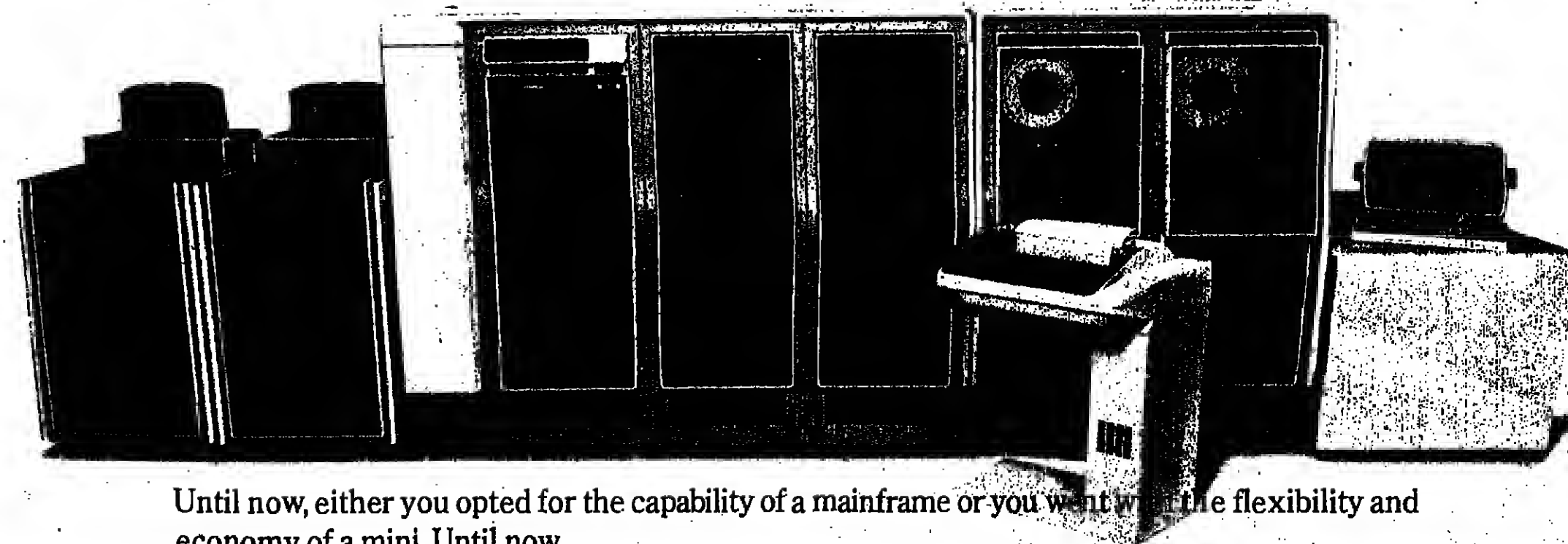
One possibility is to build a generalised editing facility. As Datamanager holds the complete specification of valid data, such as type, range, and valid values, the system could be used for centralised edit control.

Another possible development mentioned was a facility for test data generation. Using the data item database, the dictionary could be used to create comprehensive test data files automatically.

The variation in uses and potential uses so far found for Datamanager poses problems for MSP in deciding on the course of development, both in the area of new intrinsic functions and in the area of interfaces with other software.

A change in user procedure to allow the users to determine the future development direction has been instituted.

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MICHIE'S PRIVATEVIEW

The six-legged robot leaves a senator standing



Professor Donald Michie, of the machine intelligence unit at Edinburgh University, writes from Cleveland, Ohio, where he was lecturing at Case Western Reserve University . . .

IN THIS rolling State of Ohio a local dust-storm has involved an obscure robot and a famous politician, leaving the robot on its six legs, but Democratic Senator William Proxmire from Wisconsin standing inelegantly on one.

The Senator specialises in warring assaults on federally financed university projects. On this occasion he ripped into Robert McGhee, Ohio State University's professor of electrical engineering, whose development of a six-legged walking robot is funded in part by a \$400,000 grant from the US National Research Foundation. In the hilarious style which has brought light to many other ventures, Proxmire suggested that the "Bionic Bug" would be of more use as an adjunct to the university's football team.

McGhee had instant ammunition. He pointed out that the Veterans Administration is already launching tests of an artificial knee-joint for humans, developed from his technology, and that NASA had expressed interest in connection with the Mars Rover project familiar to readers of this column. Far from showing familiarity with such matters the Senator had not even sought McGhee's own comments before releasing his outburst. Now the chief official of Proxmire's committee has taken the blame and admitted that his staff should have checked.

In the context of our own country's repeated failures on the science/politics interface, this little American comedy grazes close to tragedy. The US is rich enough to be able to afford the costs and frustrations entailed by such knock-abouts. Britain is not.

Ironically, I remember a

meeting just 10 years ago with Ivan Sutherland, whose well-deserved election to the American Academy of Sciences has just been announced. He asked me whether any academic laboratories in Britain would be interested in bidding for a contract to investigate automated walking.

He was then on secondment to the US Defence Department and in charge of its Advanced Research Projects Agency's R&D spending on information processing.

So much importance was seen in such a development, that if no credible domestic bids were forthcoming, his agency was prepared to consider the unusual step of subsidising work by foreign nations.

It should be obvious on reflection why this might be so. A quick survey of the world's land masses prompts the question: "What proportion of the total terrain is negotiable by jeep or tractor? What proportion is negotiable by horse, mule, camel, llama or elephant?" Many people view automobile technology as having reached a plateau, with nothing but still optimisations here and there to be expected.

Nothing could be more profoundly wrong. It only looks that way because until supporting technologies for a new leap forward have been developed no-one can ever envisage the leap. Wheeled transport did not require the micro-processor revolution as a precondition. But legged transport does.

There is an interesting precedent. Readers may have seen artificial reconstructions of primitive birds in books of evolution. I remember from my childhood one called Archeopteryx with a majestic flowing tail. A contemporary observer (who would have had to be an extraterrestrial, since our own ancestors were not then up to ratiocinations of this kind) might have concluded that this wonderful flying frame had been highly optimised.

So it had, on the criterion of aerodynamic stability. But the remarkable further evolution of the bird's brain introduced the completely new principle of feed-back stability. A stuffed Archeopteryx could have been used as a glider. A seagull's ability to glide is unsurpassed. Aerodynamic stability has been sacrificed in nature's designs of modern birds, with a previously unthinkable gain in manoeuvrability.

Such lessons have all been drawn and pondered long ago (Privateview, August 18, 1977) by AI workers at the USSR Academy of Science's Institute of Applied Mathematics and Information Transmission, in collaboration with Moscow State University. They now have an impressive variety of six-legged robot designs under test. This too, I am glad to report, was brought by McGhee to the attention of Proxmire's Senate Committee.

Sadder of all, however, is that the successful rebuff to ignorant persecution was achieved by arguments which McGhee regards, as I do, as being entirely beside the main point. The quick-fire rejoinders happened to be ready to hand and they did the job.

McGhee's initial utterance, before his university's public relations office came to his aid, was: "Basic research is for producing knowledge, not new products." I agree with him.

PROGRAMMER NOTES

Why some programs are falling short on quality

DESPITE its shortcomings, Cobol offers good facilities for writing clearly structured and readily intelligible programs. Why is it then that so many programs fall far short of this standard?

Programmer Notes some weeks ago discussed a set of programming conventions for "Sensible Cobol", which were presented at the Online Conference, "Pragmatic Programming and Sensible Software" (Programmer Notes, March 30).

It seemed surprising that the conventions identified, including, for example, the use of meaningful names, should still need such reiteration. However, as was noted at the time, it is undeniable that much programming is read and maintained only with great difficulty by anyone other than the original author.

The speaker at the Online conference, Arne Rohde of Bang and Olufsen, made no claim that his suggestions were original. He has now gone on to describe some of the factors which in his opinion contribute to their less-than-universal acceptance.

Rohde lists six principal causes:

- Poor quality is in many cases due to the programming manager's lack of appreciation of the importance of programming style. It can be difficult to justify the use of extra programming time — which may be required to write a

good program — in terms of a possible time saving when the program has in the future to be modified.

The short-term saving is often given priority over the potential long-term saving. Even if lip-service is paid to program quality, it is not unusual to see other factors assigned a higher priority when a program is behind schedule and has to be finished by a certain time.

● Some programmers feel that standards somehow restrict their creativity, and that for better programs could be written if there were no standards.

This may be the case if programming is regarded entirely as a coding activity, but not if programming also embraces the program design phase. The over-erion to standards would probably also be less if their definition were a more democratic process, with all programmers participating in the activity.

● Some programmers consider that program "efficiency" is incompatible with program legibility and structure. A good example of this appeared in Programmer Notes a few years ago (CW, December 4, 1975), where the ALTER verb was defended as an efficient first-time fix.

I sometimes wonder if the writer who defended the ALTER ever tried using the more efficient alternative given subsequently (Programmer Notes, January 15, 1976), and if the difference was measurable.

The efficiency which many programmers consider so vital is in fact unimportant in comparison with the efficiency improvements possible using well-chosen algorithms.

● There is no general agreement among programmers as to what constitutes good programming style.

It would surprise me if there were general agreement even on the 20 points listed previously. Some of them differ from those given by Chumura and Legend in their excellent book on programming style, although most of the differences are minor.

● Despite the efforts of Weinberg and others, many programmers seldom read programs written by others. Hence they fail to appreciate the importance of legible programs which are easy for other programmers to modify. It is easier to criticise programs which are not written by yourself.

● There is a lack of literature on Cobol programming style. Recently a number of books have addressed the problem, but there are very few, if any, which are more than three years old. Rohde concludes: "Perhaps it is not so surprising after all that standard techniques for writing clear and intelligible programs have not been generally accepted."

*Cobol with Style: Programming Proverbs, by Chumura and Legend, published by Hayden, 1976.

High standards of Advanced course students

TODAY's programmer may have acquired the tricks of the art by conventional training or perhaps during hands-on sessions.

But tomorrow's programmer could well have acquired skills through Ordinary or Advanced Level General Certificate of Education computer science courses.

A review of the syllabus for the Advanced courses of any of the education boards could well cause established programmers to blush at their own lack of

knowledge. Programmer Notes saw how one course is run.

While some schools are running the courses, various Colleges of Technology are also offering "A" level studies together with a variety of both vocational and non-vocational computer studies.

The North East Surrey College of Technology at Ewell, instructs candidates for the University of London certificate. Ivor Hughes, course lecturer, said that the London Board was chosen for its emphasis on programming rather than the use of computers within industry and commerce.

One surprising side of the computing science studies is the inclusion of a project in the course. Students are expected to devote roughly half their course time to its production. The completed project is then graded by the college itself and submitted to the examining body for review. Students may be interviewed by the examiners about their projects.

The scope of the projects is essentially of the student's own choosing, but necessarily has to be self-contained. Games are an obvious choice but students can choose a project involving no actual programming; for example a feasibility study on a local company's payroll. Standards are amazingly high and could easily put commercial concerns to shame.

Programs are documented to the highest standards which are taught throughout the course. Average program size for a project would be of the order of 300-500 Basic statements. Hughes teaches a modular program construct which he says helps students to understand the problem as a whole and reduce it to component parts.

Probably the most difficult

SOFTWARE FILE

Lloyd's develops the Lots system for use on PDP-11s

MAJOR transaction processing software has been developed by Lloyd's of London for use on Digital Equipment PDP-11 computers. Running under the RSX-11 operating system on a PDP-11/70, the software is currently supporting just under 100 user terminals.

The system, Lots (Lloyd's Operational and Telecommunications System), is said to be suitable for the PDP-11/45 upwards and to require a minimum memory of 150K. It supports application programs written in Coral-66 or Macro-11.

Itself written in Macro, Lots is fully multi-threaded and provides comprehensive filing services and task management facilities. It also includes software to support teleprocessing from local or remote binary synchronous terminals.

In operation, Lots is applications and data independent, using the standard RSX-11M executive to handle such func-

tions as physical data transfers.

Multiple applications can be processed simultaneously by the software, which, on the PDP-11/70, is capable of servicing up to five message pairs per second. Lloyd's points out that up to 1,000 Megabytes of online files can be supported, by making a suitable choice from among the

six disc access methods available.

Lloyd's Management Services group, began work on the TP monitor about two years ago, in conjunction with a major software house. There was at that time no suitable software available for TP applications on the PDP-11, although DEC has

since released its own system, TPM/70 (CW, January 5).

Lloyd's is using Lots as the basis of a major insurance application. When fully implemented, the system will enable the Policy Signing Office to record about a million items of insurance business per year, from about 150 terminals.

This information is used for the settling of accounts between Lloyd's underwriters and brokers, and for the signing of Lloyd's Insurance policies on behalf of underwriters.

Representing a major development effort, the Lots software could well be of interest to other DEC users. Although Lloyd's has no explicit marketing plans, a spokesman said the group would naturally be pleased to recover, via sales, some of the large investment made in the development.

EDITED BY PETER HEWITT

Secure package being marketed by new company

MORE information has now become available on Secure, a new data access security system for IBM OS users. The package, from Boole and Babbage, is being marketed by a newly formed software products firm, The European Software Company (CW, May 15).

Secure provides protection for both disc and tape data sets, controlling access both from batch jobs and TSO terminals. The system monitors access to system software and application program libraries as well as to data files, providing a consolidated report of authorised and attempted violations.

Secure operates under MVT, MFT, OS/VS1, SVS, and MVS. The European Software Company, which is in the process of opening a UK office, is represented in Holland at Hofzichtlaan 20, The Hague.

for example to read-only access, a fixed maximum number of accesses; certain time periods during the day; specific job, user, account, or program names; or to only batch jobs or TSO foreground jobs.

Based on an access control data set, the software allows for progressive implementation, as more files are added to the body of secured data. The software can also be used to protect multiple-CPU installations via a single disc-resident access control data set, thus allowing sharing of protected volumes between processors.

Secure operates under MVT, MFT, OS/VS1, SVS, and MVS. The European Software Company, which is in the process of opening a UK office, is represented in Holland at Hofzichtlaan 20, The Hague.

Compeda establishes American subsidiary

ENLARGING on their intentions announced earlier this year (CW, March 16), Compeda has established a subsidiary in the US, with offices in New Jersey and San Francisco, and is to form a company in Holland.

Itself a subsidiary of the government's National Research Development Corporation, Compeda was set up to market world-wide software developed in the UK for high technology applications. A major part of its task is to realise the full potential, both technical and commercial, of systems developed within universities and other state-aided institutions.

Both new companies will market the full range of Compeda products, but the Dutch operation is likely to concentrate on selling its Pipework Design Management System (PDMS) to the European petrochemical industry.

In North America, the organisation's first step has been to arrange a series of seminars and demonstrations in Montreal, Houston and San Francisco. Compeda Inc will also be exhibiting at the NCC and the International Petrochemical and Process Exhibition in Philadelphia.

In addition to PDMS, the Compeda inventory includes Guelic, a computer-aided design system for integrated circuits and printed circuits, which was in part developed at Edinburgh

Meeting of joint user groups

USERS of the industry's most widely installed non-IBM program product in the UK — ADR's Librarian, with over 4,500 sites — are for the first time holding a joint user group meeting with Roscoe users. The meeting, organised by CAP-CPP is on June 8 and 9, at the Excelsior Hotel, Heathrow.

Digest updated

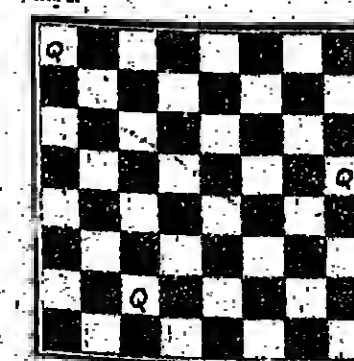
THE CICS/VS quick reference digest published by On-Line Software International of New Jersey (CW, March 2) has been updated in format, content, and price. The chief changes are a new plastic spiral binding, extended and updated technical content, and a doubling in price to \$10.

UK agency for Stop

THE on-line test aid for IBM CICS based teleprocessing systems, Stop, has now found a UK maintenance agency (CW, April 27).

Puzzler

MOST people know that five Queens are needed to "cover" all 64 squares of a chessboard, so that each square is either occupied or attacked. One way of placing the pieces is shown here.



What is not generally realised is that three Queens, Rook and Bishop can do the same job if placed in optimum positions. Can you work out this configuration before turning to page 61 for the solution?

RTL/2 for DG Novas

AN RTL/2 compiler is to be implemented by Software Sciences for the Data General Nova range of minicomputers. Development and marketing is being backed by the National Computing Centre under the Software Products Scheme and the compiler is scheduled for release in mid-1978.

This is the second RTL/2 development to be announced by the company, which is also working on an implementation for the Texas Instruments 990/10. It is also the second software message to be granted by ICI to Software Sciences, which has taken development and marketing rights to the Plant Control Package, also written in RTL/2 (CW, March 2).

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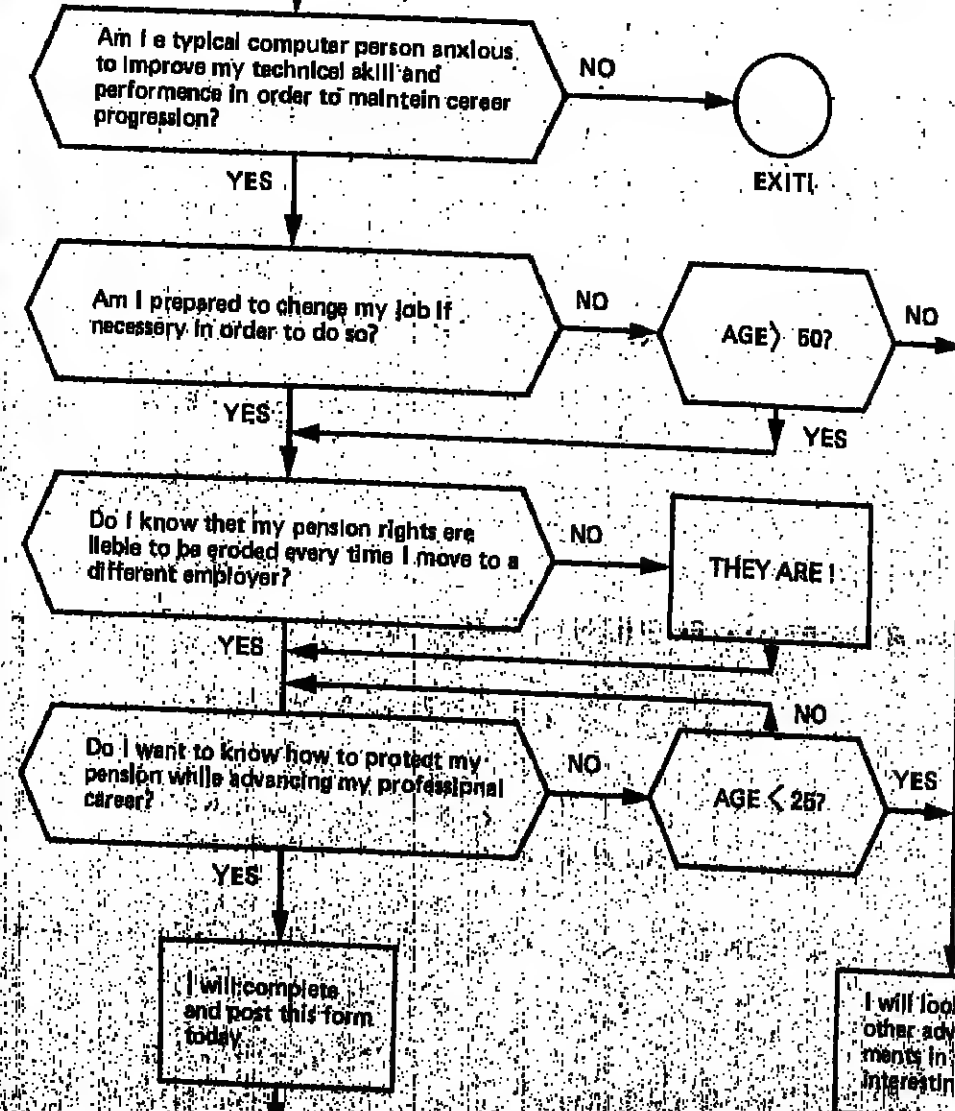
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07/07/17/85

Airborne systems to play major role

AIRBORNE computers from IBM are likely to play a major role in the updated version of the US Air Force B-52 bomber as well as being on board the NASA space shuttle when it lifts off from the Kennedy Space Centre on its maiden flight next June.

Early order for NCR 8150 system

ONE of the first orders for the NCR 8150 interactive industrial distribution system announced in January, has been placed by Alec Yorks, a small North Derbyshire based manufacturer and distributor of commercial vehicle parts. The system was designed for small businesses and costs £21,000. It incorporates order processing with a picking list, stock control, invoicing and sales analysis.

for the Marshall Space Flight Centre in Alabama. These systems are likely to be used in the Spacelab and Space Telescope projects.

Although not officially confirmed, it is understood that IBM's Federal Systems Division has been awarded the production sub-contract by Boeing for the supply of new computers for the B-52.

IBM is said to have proposed its AP-101C airborne system, which is in the same family as the AP-101 that will be on board the NASA Space Shuttle.

Although no official announcement has yet come from Boeing, the US Air Force's prime B-52 contractor, one of the competing companies has remarked that "IBM is the only company which has not received a 'Dear John' letter from Boeing."

The other contenders for the sub-contract were Univac, Westinghouse Electric and Litton Systems.

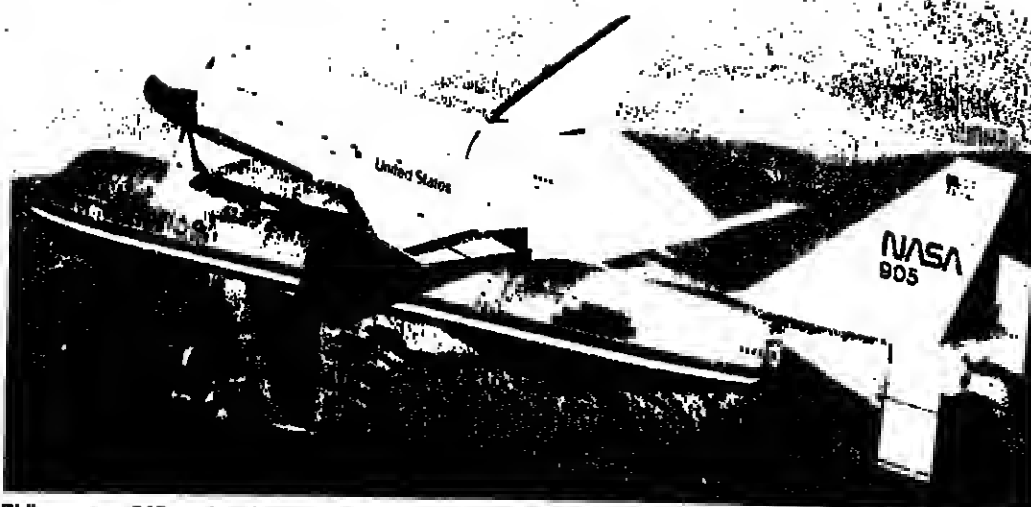
Univac has said that it pro-

posed a "close relative" of the system that was selected for use on the B-1 bomber project which has now been shelved (CW, July 7, 1977).

Westinghouse on the other hand put forward its ANA YK 15A system which was developed for the USAF's Digital Avionic Information System project. It utilises the USAF-developed Jovial 73 language which is one of seven computer languages approved by the Pentagon for use in defence applications.

The remaining contender, Litton Systems, submitted its LC 4518 system which is said to be similar to the air defence system that was also selected for the B-1 bomber.

On the Space Shuttle, there will be five IBM AP-101 computers and they will form what is known as the Shuttle Avionics Integration Laboratory, described by NASA as "the most complex avionics system ever designed."



Riding atop a 747 carrier aircraft, NASA's Space Shuttle undergoes captive flight trials at the Dryden Flight Research Centre in California. But when it blasts off from Kennedy Space Centre next June on its first free flight IBM computers will be playing an important role.

Opening up a new world for people who are disabled

INTEREST in personal computers has, until now, been largely confined to hobbyists. The machines' capabilities are at present relatively limited, and practical devices such as home word processors are still some

way off. However, one application for personal computers that presents exciting possibilities of doing substantial good for people is in their use by the disabled.

Those who are so paralysed that they cannot move any of their limbs have an enormous problem, not just in controlling their physical environment (turning on the television, etc) but in getting any sort of interest out of life. The inability to do anything other than watch and listen passively is stultifying to the mind, particularly if there is no prospect of any improvement.

There are various devices such as the POSM (Patient Operated Selector Mechanism) which enable the severely disabled to work the television and light switches by moving a stick with the mouth or by sucking and blowing down a tube. However, these are expensive and limited in what they can provide for the patient. Thus the availability now of cheap, compact computers is opening up a new world of activity for these people.

As Julio Howlett of the National Physical Laboratory points out, it is very easy to connect a joystick control to a microprocessor to allow the disabled not only to play games and operate machines, but to learn to write programs, introducing them to a whole new skill. For those who can move their head, an ordinary keyboard can be worked by a stick held in the mouth, making the operation even easier. The possibilities in this area are only just being discovered.

Chick Smith is a former army tank gunner who broke his neck while serving in Germany in 1959 and has lain flat on his back ever since. He can only move his head from side to side and slightly backwards and forwards. He lives in a foundation for the disabled in Edinburgh and can only be taken out on a stretcher; his life for the last 19 years, therefore, has been pretty bleak.

Four weeks ago, however, he acquired an Apple II personal computer, with which he is now learning to program in Basic. The keyboard has been modified slightly so that the shift and control keys latch; otherwise it is a standard unit with 16K bytes of memory, and interfaces to drive a colour TV and an audio cassette recorder. The fairly light keyboard is set up on a reading stand, like a small easel, on his bed, and he holds a rubber-tipped chopstick in his mouth to press the keys. "This has opened up a new world I didn't know existed," he says.

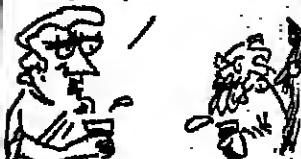
The system provides colour graphics, and a wide range of games. ("Don't knock the games," he says. As far as learning programming goes, Smith admits the concepts are totally new to him, and he is having some difficulty remembering all the rules, but he is confident

Knowledge of programming opens up for Smith a real possibility of getting a job, for the first time in 19 years. Suitable posts will obviously not be easy to find, but as interest in this subject spreads and the shortage of computer staff continues, opportunities for the disabled should improve.

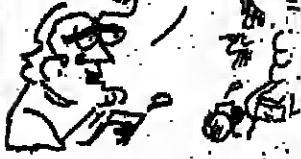
Micros could provide other benefits as well, as Paul Grant, teacher at a school for handicapped children, enthusiastically points out. Smith is an articulate talker, but many spastic children, though intelligent, are unable to communicate other than by grunts. For these, Grant says, a micro could be a "typewriter, notepad, reading book, picture book, dictionary, calculator, sketch pad, games compendium, music synthesiser and exam paper, all rolled into one."

Civeware Saga by Don

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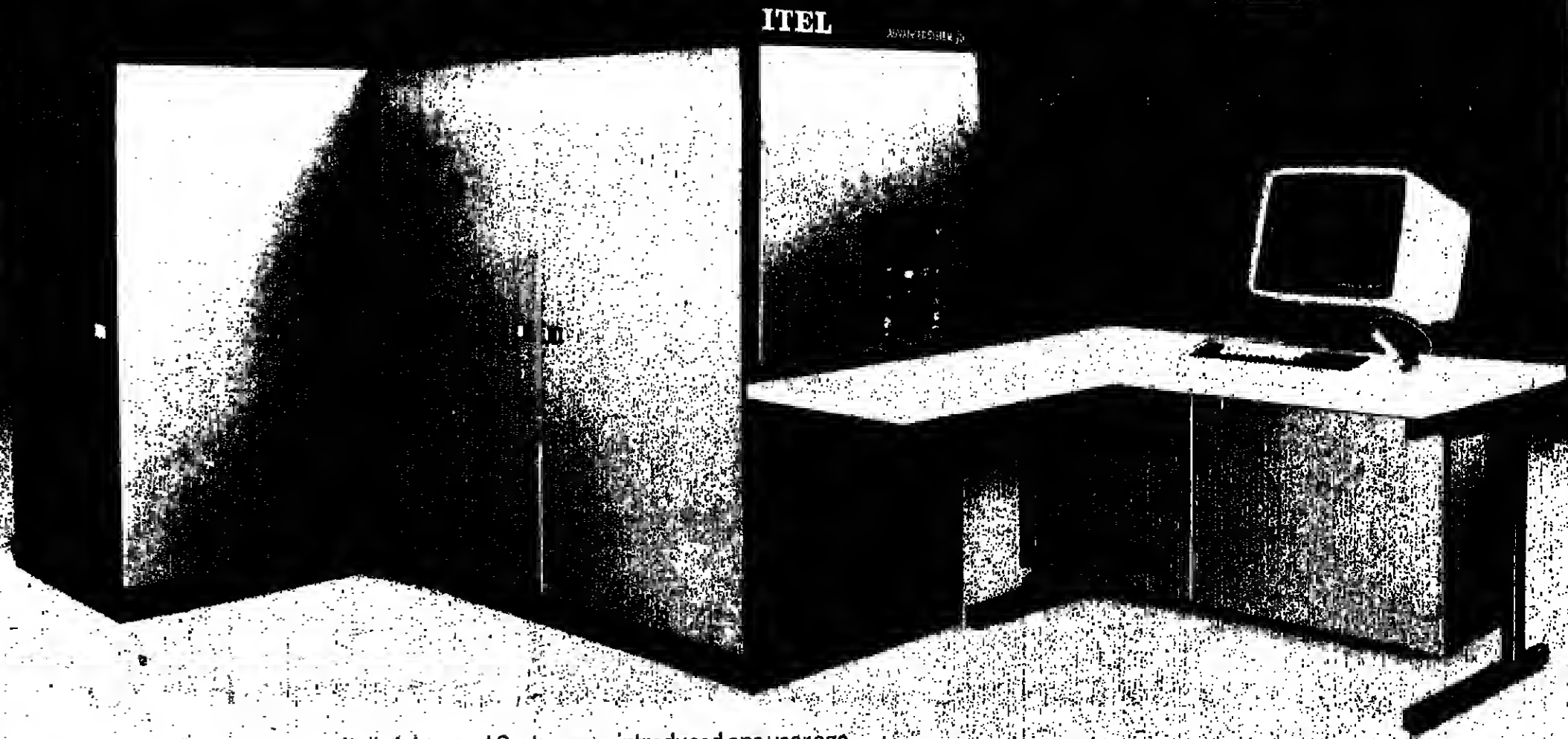
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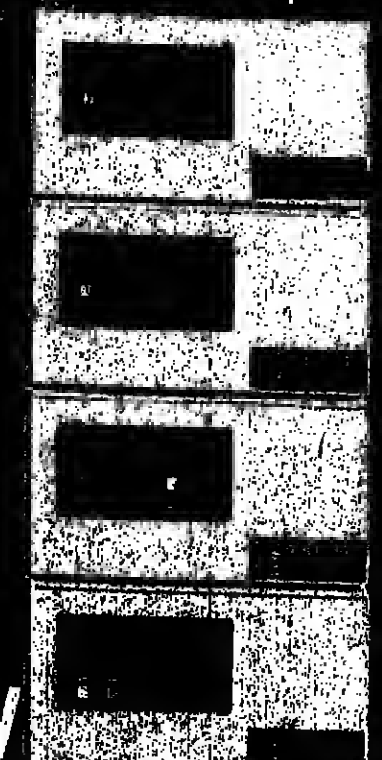
To find out more about the Advanced System, Inc. David Addison, Itel (UK) Ltd., Tel: 01-741 1482 or David Halmer, Itel International (Europe) Corporation, Tel: 01-584 5050.

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To: The Editor, Computer Weekly,
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Complexities of modern government

IS Dr Carl Hammer (CW, May 18) really quite certain that the complexity of the government of modern industrial States is a necessary adjunct to such States and a reflection of their own complexity, rather than an expression of bureaucratic empire-building which is made all the easier with computers?

Dr Hammer mentions the 200,000 new laws passed in the US alone each year. How can anybody keep track? With computers, Dr Hammer would say,

but why is this necessary?

As it is, businessmen complain that the government makes so many rules, and changes them so often, as to prevent them from carrying out their real functions of wealth creation and the provision of jobs for those made unemployed by the computers. In short, it prevents the very complexity of society of which the bureaucracy is supposed to be a model.

No, the more complex the society, the more simple should be the ground rules in which it

operates. Only in that way can there be prevented the rigidities which, in a changing world, would otherwise cause the society to ossify, decline, and collapse.

The simpler the government and laws of a society, the easier it is for it to contain new, and more complex types, of human relationships.

C. G. BREINER
Haywards Heath,
Sussex.



Dr Hammer

Interested in forming a computer AGIT group?

THE CW juxtaposition of letters (CW, May 18) by Tim Wilcock (lack of venture capital for information technology) and Ivor Cotti (reluctance of existing management/policy structure to pass control to technology-savvy computerists, hence lack of real, coherent support for information technology future policy), plus Tony Benn's reported call for a "company-by-company" examination of the effects of computer technology (CW, 25 May), perhaps together provide the trigger to decide that the time

has now come to press the Action Button to examine the issue defined in the recent ACM meeting and my article, "Time for City to back new technology" (CW, March 31, 1977).

Too much unco-ordinated discussion by too many (albeit august, erudite and even work-motivated) separate bodies on too vast a subject can only lead to severe doubts that a clear, coherent policy will emerge; that action will actually be taken based on this policy; and that the policy/action taken is realistic (whether "right", "good" or "bad") one cannot hope to decide something is needed.

Hence AGIT, Action Group on/for Information Technology.

OBJECTIVES: If you don't know by now, it's not for you.

FUNCTION: Co-ordination of information coming out of all those myriad discussions/reviews / studies / investigations which are taking place. Definition of a realistic policy, qualitative and quantitative details fully worked out. Education: change, or use to good benefit, the poor born out of ignorance of the "masses". For starters, use viewpoints for AGIT's own information dissemination. Publicity: like any successful product, AGIT

must be well promoted and marketed. A media "celebrity" therefore is a "must" as champion. Action, to get the power lines to implement the policy.

METHODOLOGY: See action minutes of any successful project team: no more than 7 outside directors and 1 strong head, Patmanon small secretariat. The whole supported by 1 Member ship. For starters to include BCS, IEEE, CSA, ACM, IDPM memberships, recipients of the weekly computer newspapers. Suggestions, plans, for directors/ head/chairperson. No-one who can say "I believe in an Information Society" without thinking will be excluded. 2 Funding. Come on, if we don't invest in defining the future of UK IT, how can you expect the government, City, trades unions and other industries to do so?

STRUCTURE: So how do successful social revolutions start? Produced a 64K RAM, so the British company has a very limited time-scale in which to get set up if it is to be successful. Three US manufacturers, Intel, Mostek and Texas Instruments, are currently in the last stages of the design cycle, with first samples of the products expected by the end of this year.

The Fujitsu part has been called by some observers more of an engineering exercise than a real market entry.

This is because the memory, although of relatively small size at some 180 mbs square, requires two rather odd voltage supplies to operate. These are +7 volts and -2 volts, and are needed so that a voltage swing of 9 volts can be obtained, thus making the design task for high performance easier. Most microelectronic equipment however, operates on a single +5 volt supply, and the Fujitsu part will undoubtedly cause some systems engineering problems.

Some samples of the Japanese device are already available, and Intel, Mostek and Texas Instruments are looking towards the year end to do the same. There has been speculation that limited production could even be started by some of them by that time, though most indicators point to the middle to the end of 1979, and probably even 1980, before volume production starts.

It is this time-scale that the new British company will have to match, and preferably beat. If its products are to stand a chance in the world market, and a pattern seems to be emerging from the industry what the part should be like, if it is to succeed.

This pattern indicates that the memory should be 5 volt supplied, mounted in a 18-pin package with multiplexed data and address lines, and should be available by about 1980 with a 150 nanosecond access time.

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MICRO NEWS

NEB faces tough odds in RAMS

THE new British memory maker, even with the backing of the government's National Enterprise Board, can almost certainly expect a hard fight if it is to gain a major share of the world market for 64K RAMs.

Indeed, the reaction of some companies already in the business has been to suggest that memories should be the last sector to attempt to enter now, especially as the prime target is the American domestic market.

But the decision by the Cabinet and the NEB to go ahead with plans to invest some £30 million in a group of expatriate British engineers, together with other nationals, to set up a British-based company, gives the UK the opportunity to snatch the lead in semiconductor technology away from the Americans for the first time and this in a market area which, at an estimated value of \$250 million by 1983, could become the biggest money-spinner ever in semiconductors.

The competition, however, will be fierce, and the production problems difficult to overcome. As reported, the Japanese company Fujitsu has already introduced a 64K RAM, so the British company has a very limited time-scale in which to get set up if it is to be successful. Three US manufacturers, Intel, Mostek and Texas Instruments, are currently in the last stages of the design cycle, with first samples of the products expected by the end of this year.

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This rough specification and time-scale, at which the US companies are already aiming, could then be expected to remove the threat of the Fujitsu device with its different power requirements. Observers however, indicate that if these targets are not met, the Fujitsu memory could well win out, just by being available.

The other major problem for the new company to overcome is that of production. Memories of this size will be using track geometries of 2-3 microns, half the size of current devices.

Getting down this small is pushing the capabilities of the current production techniques to the limit. The photolithographic method used to place the circuit element patterns on to the silicon, using normal light sources, can just about resolve such dimensions, and some manufacturers of the equipment are planning to use ultra-violet light sources of shorter wavelength to approach 1 micron resolution.

To get below these geometries, the ultimate solution will be to use either raster or vector scanned electron beams to "write" the circuit patterns on to the silicon. Half micron geometries can be achieved by this method, but it is both difficult and expensive to use.

A recent comparison produced in the US by stock analysts, Morgan Stanley, indicated that the equipment depreciation costs involved in processing good circuit wafers ranged from \$1.00 for current photolithographic techniques, to \$0.50 for electron beams. This means that each circuit would have to cost at least 30 cents, just to cover the cost of the E-beam equipment, without any amortisation for other production and test equipment, or production and assembly costs.

Editing terminal for Prestel

WITH the Post Office's Prestel videodata service now a reality, the time is ripe for launching equipment aimed at that market. The latest introduction comes from Jamin Electronics, with VET, the videodata editing terminal.

Aimed initially at the Information Providers for the Prestel service, the VET is a microprocessor based terminal designed to provide the IPs with a free standing, remote job preparation, and information transfer system.

It can, however, be used in a variety of other roles such as being a specialist visual display terminal with colour graphics, remote entry terminal, and data logging.

This variety of roles means that the VET can be configured, to meet the different requirements. For the Prestel IP, it allows up to 8K bytes of RAM to allow the offline generation of information pages for the system.

Up to eight pages can be stored in this way, and then transmitted to the Post Office computer during off-peak periods.

The operating system contains powerful editing facilities, together with operator prompting, held in ROM. This features page header identification formats, insert and delete blocks, line and character transposition text, and open and close gaps in pages.

To add to the data storage capacity of the system, the company is also making available two interface units, one to accommodate digital cassettes, the other for floppy disc drives.

Morgan Stanley indicates that a third, intermediate technique, known as Direct Step on Wafer also has recently been introduced. This is a development of the step and repeat printing process already used in semiconductor manufacture, and is capable of resolving 1-2 micron geometries with a wafer depreciation cost of \$7.50.

It will be interesting to see which of these three techniques the NEB-sponsored company selects. Initial indications are that it will go for electron beam processing. If it does the 18 to 24 months lead-time required to start up the operation may give it time to alter or at least accommodate these sums.



GETTING your hands-on was one of the advantages of the recent Commodore seminar on personal computing, "Petting for Beginners." Five Commodore Pet and two KIM 1 microcomputer systems were on hand for the delegates to practice. Four people, two on each day, walked away from the seminar with a system each as prize. Winners of the two Pets were B. Hurdridge and J. D. Smith, while B. Gordon and M. Odlin won KIM 1s.

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WITH the Post Office's Prestel videodata service now a reality, the time is ripe for launching equipment aimed at that market. The latest introduction comes from Jamin Electronics, with VET, the videodata editing terminal.

Aimed initially at the Information Providers for the Prestel service, the VET is a microprocessor based terminal designed to provide the IPs with a free standing, remote job preparation, and information transfer system.

It can, however, be used in a variety of other roles such as being a specialist visual display terminal with colour graphics, remote entry terminal, and data logging.

This variety of roles means that the VET can be configured, to meet the different requirements. For the Prestel IP, it allows up to 8K bytes of RAM to allow the offline generation of information pages for the system.

Up to eight pages can be stored in this way, and then transmitted to the Post Office computer during off-peak periods.

The operating system contains powerful editing facilities, together with operator prompting, held in ROM. This features page header identification formats, insert and delete blocks, line and character transposition text, and open and close gaps in pages.

To add to the data storage capacity of the system, the company is also making available two interface units, one to accommodate digital cassettes, the other for floppy disc drives.

Mail order firm for Pet software

A NEW mail order software company has been established in London to specialise in program packages for the Commodore Pet personal computer.

Known as Potsoft, the company is currently producing its first catalogue of software, to include a range of games and small business packages which make extensive use of the graphics capability of the Pet. In addition, the catalogue contains an omnibus, a range of maths packages, a payroll package, and a line re-number program.

The software has largely been written in the UK, though some has been prepared by the company, and by freelance programmers in the UK.

Potsoft is based at 318 Fulham Road, London SW10.

Playing single card game

A NEW single card computer from US microcomputer manufacturer, Cromemco, is to be introduced into the UK by Comart. It is claimed to be one of the first systems that brings the flexibility of the S100 standard into the microcomputer market, where it has been selling its Z2 microcomputer system as a "black" box. This system has in fact, recently been repackaged in a brown box, and is being called System 3. It incorporates the Z80 micro, 32K bytes of memory serial and parallel I/O and up to 4 diskette drives, and costs £4,175.

Based on a Zilog Z80A microprocessor, the card specification includes 1K byte of static RAM, up to 8K bytes of PROM, and interfaces for serial and bi-directional peripherals. A monitor and control Basics are also

If you think you have found the most cost effective key-to-disc system from the world's leading supplier, and it's not from Inforex, well...

Think again! About cost effectiveness: from Inforex you can get a complete three key-station system for under £10,000. Think delivery again: you could do away with punched cards by the end of the month. Think again about service: a reliable, well proven range backed by a national service team. Any way you think about it, Inforex offers the best available solution. The world's leading supplier, with over 4,500 systems worldwide, will take you from punched cards to key-to-disc (expandable to meet your most exacting requirements); to data management and to distributed processing with a compatible product range and the support to make it happen. Telephone Inforex at 01-863 8311, or send the coupon for full details to: Inforex Limited.

INFOREX Data Management Systems
Inforex House, Headstone Road, Harrow HA1 1PL.

Interfacing made easy

IT should now be easier to interface microcomputer systems to other computer systems using the IBM SDLC communications protocol following the introduction by Intel of the 8273 SDLC protocol controller.

The part handles all the data handling and frame formation during transmission, and also data validation and recovery on reception.

In operation, the CPU outputs a command to the 8273, such as general receive, or selective receive, and is followed by up to four parameters. The device then executes the command, leaving the CPU free for other tasks. After execution, the result is held in the 8273 for accessing by the CPU.

Please send me further information on Inforex key-to-disc

Name _____
Company _____
Address _____

Harris Series 100 speaks your kind of language

Fortran IV · Cobol 74 · Basic · Harris Macro Assembler · RPG11
Forgo (Diagnostic) · Snobol 4

In fact, the Harris Series 100 range of five general-purpose, virtual memory computer systems can handle all these languages simultaneously. That makes them ideally suited for use in commercial, scientific and educational roles.

Each of these modular, complete systems is an expanded and more powerful version of the S110, the basic model in the series which features:

- 96K Bytes of Memory and a Scientific Arithmetic Unit
- System console CRT with keyboard and controller
- 10.8M Byte Cartridge Disc and 9 track, 800 BPI, 45 IPS Magnetic Tape Unit, with associated controllers
- DMA Communications Multiplexer
- Seven language processors, five support libraries—

including Total, the renowned Data Base Management System and four RJE and two RBT packages.

A card reader and line printer are standard with all, except the basic system, the S110.

To ensure maximum efficiency in every system, the Harris Virtual Memory Manager (VULCAN) comes as part of the overall package.

VULCAN is a comprehensive demand-paging virtual memory operating system with a simple user-oriented job control language.

With VULCAN each system can operate concurrently in interactive time-sharing, multi-level batch processing and real-time processing modes. And with VULCAN, all seven processing languages and support libraries can be used simultaneously.



The System 120, part of the Harris series 100 range.

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I MUST confess to a feeling of apprehension at the prospect of a Codasyl standard JCL, to be agreed "in about a year" (CW, March 16).

Language designs produced by committee are not notoriously sound. Witness to this is Codasyl's first product, Cobol, "which at first sight appears to be made up entirely of special cases" (D. W. Borron).

To be sure, Cobol is a praiseworthy pioneering attempt at a machine-independent language; but that's just the point: it is a pioneering attempt, not was.

Cobol does have undeniable merits — its separation of the descriptions of data and processes; the division between physical and logical aspects of data description; the hierarchical approach to the latter; the provision of I/O exception declarations — but all of these have since been incorporated into languages that are not only better in other respects, but have improved upon these merits. The success Cobol has had in the programming market-place is due to no continuing virtue of the language itself, but to the mighty clout of the US Defence department.

Moreover, the Codasyl attitude towards updating their product is exasperatingly conservative. Why should a language intended for common use be tied down to the specific hardware peculiarities of one manufacturer, such as 18-digit computational registers (ANSI 74 Cobol)?

Just as bad is the lack of structuring facilities. Messrs. Böhm and Jacopini's studies on algorithmic structures have been available for more than a decade, yet not only did the 1974 Cobol standard ignore the need

for an in-line loop facility, but it requires the next standard will probably do so as well!

This conservative attitude towards development may incidentally help explain Captain Hopper's conservatism in his own use of Cobol. "I wouldn't dream of using a multiprogrammed or nested IF," she says (Software File, March 16), explaining that "nested IFs quickly become difficult to understand" and "you always get better object code from a collection of simple IFs anyway. Nested IFs are a whole lot easier to understand in a language that provides a formal loop construct statement facility, plus the ability — only partially supplied in 1974 Cobol — to write comments in-line. As far as object-code efficiency goes, Captain Hopper's complaint applies not to Cobol, but to those manufacturers who, 20 years after the B5000, still cannot provide structured processors for the support of structured languages.

Codasyl's COSCL, "using current 'state-of-the-art' language techniques", is bound to be another pioneering effort. Let us hope that the BCS can persuade Codasyl to view the project as Dr Ian Newman does — as an interim step. They have Cobol after all, to stand as "an awful warning of the dangers of premature standardisation" (Borron, again).

"You should be glad that bridge fell down," (Isambard Kingdom Brunel told the directors of the Great Western Railway — "I was planning to build 13 more to the same design."

DON MILLS
Talis,
Lower Hull,
New Zealand.

Board takes tough line on standards

THE Computer Board is trying to ensure that manufacturers will cater for the architectural structure used in networking that has been suggested by sub-committees of the International Standards Organisation and the British Standards Institution.

This involves independent layers from the physical communications level to the host's job management software. These are implemented in hardware or software or both, but should be separable so that they can be changed as developments take place in any layer, or as alternative implementations are offered from other sources than the original.

At the physical end the recommendations of CCITT are known and defined and the Computer Board requires conformity with them; specifically level 2 of X25 for control of links to the network, which may be direct from the processor via a front end processor or a communications controller. And the operating system must be capable of handling virtual calls and packets in conformity with level 3 of X25.

At the terminal and connections are covered by X28 and X29 for synchronous and asynchronous mapping between them by X3, and the ability to communicate with these standard terminals must be provided from the miniframe end.

Moving away from the physical network connections the standards are less well defined and the concept of a transport station is still being translated into specific terms by the BSI's Data Processing Standards committee number 20.

This will also be a module or collection of modules that will handle allocation of network links, set up and control calls from end to end across the network and interface to higher level protocols.

Nearer the host high level protocols step in, and here there are no definite standards but the Computer Board has adopted

the File Transfer Protocol from the High Level Protocol Group, and this has been submitted to BSI and ISO. A virtual Terminal Protocol may also emerge soon.

In the case of job control, manufacturers must indicate below how their facilities may be

Stop spread of computers to save jobs, urges councillor

A COUNTY councillor from West Midlands has called for the spread of computers to be stopped in order to save jobs. Conservative councillor Sir Francis Griffin complained that computers are now being used to such a large extent that hundreds of ordinary people, and young people in particular, cannot find work.

Sir Francis pointed out that if at one time 400 or more people were employed calculating

INCREASED freedom for university users in selecting equipment and interfacing to networks should result from the tougher approach being adopted by the Computer Board on manufacturers meeting internationally agreed standards (CW, May 25). The board's approach to standardisation was outlined in a letter sent to manufacturers earlier this year, which pointed out that from December 1980 manufacturers would have to meet certain standards before their tenders would be considered for university contracts and from January 1979 the requirements would be included in invitations to tender. Here DONALD KENNETT reports on the details of the Computer Board letter.

exploited in a network environment. Beyond existing and proposed standards manufacturers must

supply procedures to monitor traffic and resource utilisation, run diagnostics and aid module development by the user.

Stop spread of computers to save jobs, urges councillor

wages and pensions by an organisation, they now could be replaced by one machine needing only a handful of staff to operate it.

"There is a lot of work being steadily and ruthlessly put on to computers which should be handled manually," he said.

Sir Francis said that he refused to accept that computers are more efficient than human beings. They could not take

account of special circumstances and could never accumulate the experience and flexibility of a good human doing the same work, he insisted.

"If high pressure production techniques displaced humans then this has to be stopped," he said, adding, "I am not a Luddite — I am merely anxious that in all kinds of production discussions, the need to employ labour is the vital factor."

64K bytes of memory in Japan's 'single' minicomputer

A SINGLE board minicomputer featuring 64K bytes of random access memory and a 16-bit single chip central processor, has been introduced in Japan by Toshiba.

Known as the Tosbac Micro, the board is the first high capacity single-card system from a Japanese manufacturer. It features an input-output control unit, a clock generator, an initial loader, and a base Toshiba's Tosbac-40L micro.

This is combined with a memory unit constructed from 32, 16K bit RAMs.

Controlled by microprogram the system operates on a construction set of 148 instructions. It has a double bus structure consisting of a high speed memory bus, and a medium speed input/output bus.

Prices for the system are quoted by Toshiba as £100 for sample quantities, and £150 for quantities.

OP SPOT

It pays to stand up for your rights

TOO little notice is taken of the operations department until it ceases to function correctly for one reason or another.

Operations staff must "make themselves heard" to management and company health and safety officers to ensure that a high-standard computer room environment is established and maintained, according to Mike Evason, computer operations supervisor at Howard Tenens Services of Swindon.

He says that he has always followed this procedure and gives his own installation as an example of what can be achieved.

"We have a first-aid cabinet of the approved type, and our shift leaders are St John-trained in how to use it; we have automatic fire detection, with an alarm and dialling-out system; and a large, but necessary, data security system.

"Facilities are available for making tea or coffee on shift, and our operators may take a break to have a cigarette whenever they choose. We work on an 'honour' system which appears never to have been misused."

For operators who feel they are getting a "raw deal", he advises: "Inadequate fire or intruder security systems push up the insurance costs for the site — encourage your manager to look into this."

He points to the legislation in existence and says that health and safety inspectors have the power to see that it is enforced in factories, with the public health inspector having like jurisdiction over the "purely commercial office environment."

According to Evason, the Offices, Shops and Railways Act of 1963 has sections relating to both fire hazards and first-aid.

Referring to section 27 (1) of that Act, he says: "You are within your rights to refuse to work in an area that does not have suitable fire extinguishing equipment. In the computer room this means hand-held equipment or automatic CO2."

Quoting from section 28 (1) of the same Act he says: "A first-aid box or cupboard containing only first-aid requisites must be provided for use by the employees and be readily available."

He says that the above regulation almost always means a first-aid cabinet in the computer room for sites where shifts are worked, and adds that such a facility should be in the hands of a responsible person.

He continues: "It is worth noting that both the St John Ambulance and the Red Cross run suitable courses which in total cost less than £10 per person. Any relatively aware DP manager should be willing to pay for and encourage attendance by suitable staff."

In relation to staffing, shift work and rest-room facilities, Evason refers to the Health and Safety at Work Act.

"Under the new Health and Safety at Work Act (Section 2), it could be construed as not conducive to the welfare of an employee to work a shift on his own."

He points out that apart from the Act, it is inadvisable for a person to work alone "particularly at night", because he might make errors which go unnoticed, leading to reruns and further criticism of operations from other departments.

Mentioning the fact that a number of sites have no rest-room, he says that the operators should use the Health and Safety at Work Act "as a lever" at least to get facilities for making a hot drink.

"No member of staff must work more than five and a half hours continuously without a break of at least 30 minutes remote from his work," adds Evason, referring to the Act.

According to Evason, new powers are coming into force on October 1, under the Health and Safety at Work Act. Then it will be mandatory for a safety policy to be drawn up and displayed in all places where five or more people are employed.

Rees resigns as Opcomm chairman

PRESSURE of work has forced Mike Rees to resign as chairman of Opcomm, the operations group centred in Coventry. He is succeeded by Russ Bevan, the group's vice-chairman.

The loss of Rees is a blow to the group, for he proved a natural leader and was a driving force behind many of its activities.

It comes at a time when Opcomm is beginning to gather momentum, and has generated considerable interest, both among operations staff and in the computer industry as a whole.

Opcomm was formed in early February, with the express intention of creating a situation in which operations is recognised and accepted as a vital part of the industry, and accorded a status worthy of its function. In this context, the group carried out a computer room environment survey, which was commissioned by Computer Weekly and involved contacting some 40 installations.

As a result the group produced a report which pointed to the lack of concern about the computer room environment, and which made recommendations for standards.

The group is also greatly concerned about the scant training accorded to operations staff, particularly new entrants. Because of this it is currently involved in a training project.

The next meeting of Opcomm will take place on Tuesday, June 13, at 8.00 pm, at the Sphinx Social Club, Rolls-Royce, Parkside, Coventry.

Operators often complain that nobody listens to their point of view. Well, Op Spot is listening and Bernard Allen would like to hear your opinions and ideas on all matters relating to computer operations. Your letters should be sent to Op Spot, Computer Weekly, Denart House, Stamford Street, London SE1 8LU. Telephone 01-583 8888. Bernard can be contacted directly on 01-261 8038.

By Bernard Allen

GEC pay dispute reaches deadlock



Hardie

AS the GEC operators' pay dispute approaches the end of its fourth month, a solution seems to be no closer than at the beginning of the affair.

According to John Hardie, who is a shift supervisor at GEC and the operators' union representative, "We definitely won't be giving in because all the operators need the extra money."

The operators have been very

active during the strike, regularly picketing the main gates at GEC's Stoke, Coventry plant. On one occasion the traffic outside the factory came to a standstill and the police had to be called in to get it moving.

They staged a sit-in at the company's contract engineers section on Tuesday, May 23, and followed that by occupying the computer room on the following Friday.

The operators vacated the com-

puter room when they heard that police were about to be called in.

Says Hardie: "We were disgusted that we were going to be arrested — to be honest we didn't realise we could be put away."

Their next action will be to produce leaflets to keep other employees informed about the issue, and ask them, as Hardie puts it, "To black all input and output to the system and ban all use of VDUs."

HINT OF THE WEEK

Speeding up disc unloading in OS/VS

MUCH comment has been generated by the hint of a couple of weeks ago which explained how the IBM OS pseudo-writer, often called SCRAPIT or WTRZ, can be MODIFIED in order to erase unwanted output, other than the class 2 output which it usually serves.

Last week Eric Murphy of Barclays Bank, Manchester, pointed out the risk inherent in this procedure — that other output may be erased unintentionally.

New Barry Oenyer, a senior systems operator with Lloyds Bank in Warrington, Sussex, agrees and says that it is best to use the more conventional method — to REJECT the output to the class served by the pseudo-writer rather than MODIFY the procedure itself. This is achieved by the following OS command:

E JOBNAME, OUT= Old Class, CLASS= that served by the pseudo-writer

Oenyer also discusses further points about the pseudo-writer. He says, "Our pseudo-writer is called WTRZ and we give it an

identifier of P, which is very useful when it comes to closing the procedure down." He also gives the OS commands to start and close the procedure:

To start it: S WTRZ.P

To close it: P P

He goes on to discuss, and has a hint relating to, the allocation and de-allocation of devices in the OS/VS environment. Now in the normal course of events, UNLOAD and VARY commands do not take effect until a job goes into initiation, but Oenyer has a way round this.

He says, "With a two system set-up, it is sometimes essential to vary offline or unload disc packs immediately, rather than wait for an initiation/termination."

To achieve this, he says, start a "dummy" procedure in a free partition. The procedure will itself fail with a JCL error, but will have the desired effect of unloading the discs. He gives an example of the OS command to start the "dummy" procedure:

S O.PX ("X" represents the number of the free partition.)

R-range Facts

Hardware

R100	8 terminal data entry and distributed data processing system
R300	20 terminal data entry and distributed data processing system
R400	48 terminal data entry and distributed data processing system
R550	30 terminal mixed media data entry system
R830	8 micro terminal distributed data processing system
R850	24 micro terminal distributed data processing system

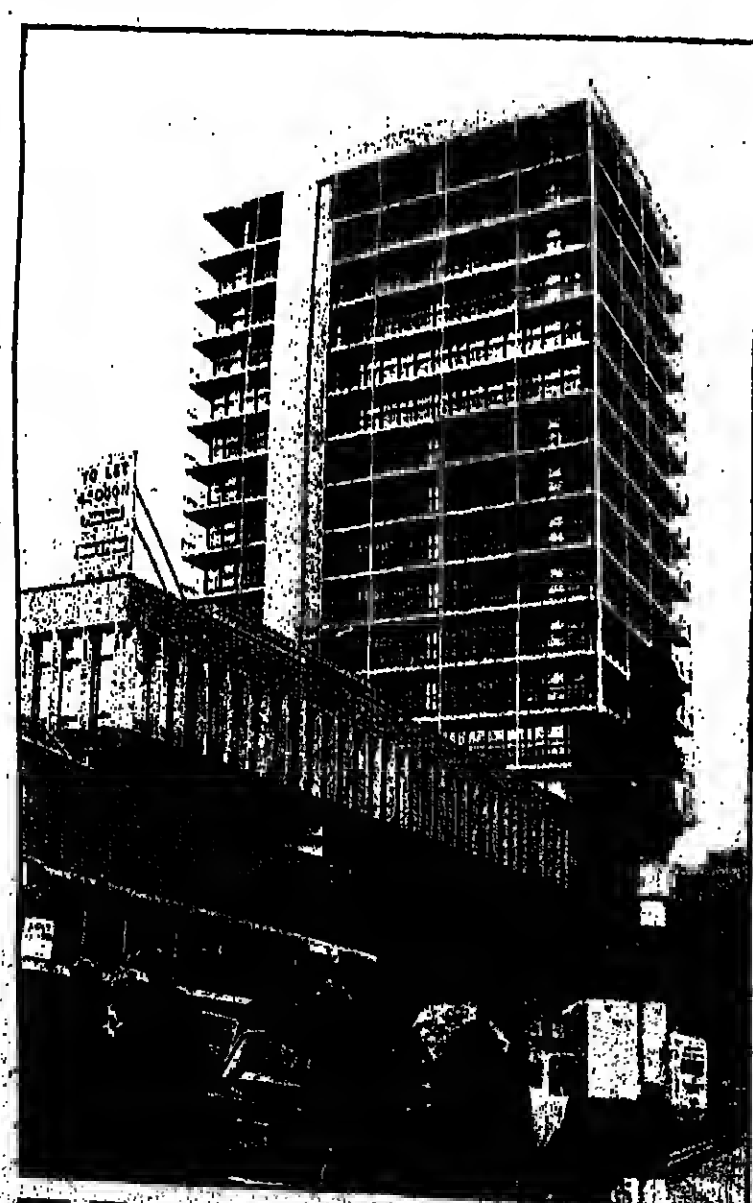
Software

	S100	R300	R400	R550	R830	R850
Multi-Tasking Operating System	•	•	•	•	•	•
Virtual Memory	•	•	•	•	•	•
Virtual Terminal Operation	•	•	•	•	•	•
COBOL-like Application Language	•	•	•	•	•	•
Format Language	•	•	•	•	•	•
Interactive Program Development	•	•	•	•	•	•
Test Editing	•	•	•	•	•	•
Systems Log	•	•	•	•	•	•
Operator Statistics	•	•	•	•	•	•
Re-entrant Code	•	•	•	•	•	•
Stack Processing	•	•	•	•	•	•
Independence of Data & Code	•	•	•	•	•	•
Structured Data Sets	•	•	•	•	•	•
Multi-level Indices	•	•	•	•	•	•
Multi-level System Security	•	•	•	•	•	•
Command Sequence	•	•	•	•	•	•
Data Entry Software	•	•	•	•	•	•
Distributed Data Processing Software	•	•	•	•	•	•
Dynamic Disk Management	•	•	•	•	•	•
Seek Optimisation	•	•	•	•	•	•
Full Range of Utilities	•	•	•	•	•	•

Data Communications

Burroughs TC 3500	•	•	•	•	•	•
Burroughs TD 830	•	•	•	•	•	•
IBM 2780/3780/3741	•	•	•	•	•	•
IBM 3270	•	•	•	•	•	•
HASP RTE	•	•	•	•	•	•
SDLC	•	•	•	•	•	•
ICL 7020	•	•	•	•	•	•
ICL 7502/3	•	•	•	•	•	•
ICL 7181	•	•	•	•	•	•
Redifon Synchronous	•	•	•	•	•	•
Redifon Asynchronous	•	•	•	•	•	•
Univac 1004	•	•	•	•	•	•

Yesterday's branch office



Today's



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silent 700
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R-range
with you all the way

The Computer Weekly/Dataskill essay competition Computerstyle 2000 proved to be so close that the judges decided to split the first prize between Bryn Jones of Haverfordwest and consultant David Butler (see front page). The

winning entries were of different styles. David Butler's took the form of an excerpt from A Social History of Britain in the 20th Century published in the year 2000, while Jones' entry, published here, was in story form.



Once a week she went out to work. . . . She walked the whole two miles, enjoying the exercise.

By
**BRYN
JONES**

educator, estate agent, building society, travel agent, electoral register, pulling booth, National Payment assessor, Job Finder, friend finder, hunk, bookmaker, bingo club, office, postman, mail order catalogue, stockbroker, solicitor, medical adviser, where would it stop, she wondered.

The Net charged for most services, but was usually very cheap. It had gone through an aggravating phase of constantly revising prices according to demand but this was sliding out now. She could choose the advertising content to suit herself and her pocket, but new films, plays and music were exorbitant even with 20 per cent advertising, and she usually asked friends in to share the cost.

The demise of fixed time TV was a boon, although as Communication Street was released to the Net on Monday and Wednesday evenings, some addicts had not noticed much change.

But to her, being able to call up a selection from some 50 or more years of films, music, and programmes was distinctly good. Her favourite pastime, though, was to browse through the poems, articles, literature, films and music put into the Net by private individuals and groups at their own expense.

They could charge any price for access, but as only the famous few made any money from it, most subscribers allowed free access.

There was such a plethora of creators seeking attention for their work that it would take her until she died to sift through an increasingly small proportion of it. The Net gave her some help with selection on the basis of content, and of the age, sex, education, and interests of the author, but to date had been hopeless at judging style.

Invitations to view the Digital Equipment PDP-11/34 system the college has recently installed are also generally accepted with alacrity.

Ashridge's courses, held in the college itself or in-house for individual organisations, cover a wide spectrum. Though they do not include the basic aspects of computer science, such as programming, computing facilities are used in at least half of them. Nearly every general management course, for instance, includes a computer-based exercise, marketing being a favourite subject. Senior management courses involve at least one computerised case study.

Typical subject for demonstration on a terminal are mortgage calculations and discounted cash flow and techniques like linear programming and statistical analysis. A program written by Ashridge staff is designed to show that computers can deal as easily with alpha as with numerical input. A financial modelling and an economic forecasting package are also among those that have been written, however, that computer-based techniques offer only a few of several approaches to problems and are not an end in themselves.

Course members are also encouraged to use terminals for themselves. Available programs include the Apollo landing exercise and Nim, a game designed to test capacity for logical thought.

The college's remaining 50% of computer usage is accounted for by research carried out by its tutorial staff or as an adjunct to the consultancy assignments carried out by many of these and for which clients have to pay.

Since the inception of time sharing service bureaux some eight years ago, Ashridge has drawn on these for its require-

Each year nearly 3,000 managers from commercial, industrial and government organisations attend general management courses provided by Ashridge Management College. Though most organisations have been computer users

for years, personal contact with a computer system is a new experience for most of the students. Here, LAURA TATHAM describes the computer-based studies at the college which form part of the overall management courses.

The college where managers learn about computing

EVERY year, some 3,000 managers of all levels attend courses provided by that prestigious educational establishment, Ashridge Management College. Many of these come from top commercial, industrial and government organisations most of which, it may safely be assumed, have been computer users for at least 15 years.

Yet, says David Hutchings, who is in charge of the college's computing facilities, personal contact with a computer system is a new experience for the majority. This supports the contention of writers in Computer Weekly and other journals that most British managers have a disarming lack of first-hand knowledge about the practical application of computing techniques.

Probably at least some of the blame for this situation lies with computer-using organisations, for Ashridge students respond with keen interest when given an opportunity to witness demonstrations and to use interactive systems themselves. Indeed, one student, armed with a code for access to a remote time sharing service, asked if he might use a college terminal to discover what his company was doing—a request that, disingenuous or not, was predictably refused.

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Since the inception of time sharing service bureaux some eight years ago, Ashridge has drawn on these for its require-

ments. Its experience has been eclectic, having included Telcomp, Timesharing Ltd, Honeywell-Bull, GEIS, Call-360 Comshare, W.S. Atkins, University Computing and Honeywell Mark III, among others.

Hutchings' account of the reasoning that led to the decision to install an in-house system is likely to be of interest to all those currently thrashing out the great minicomputer time sharing debate. One factor, though not of overriding importance, was costs. Those of the bureaux themselves are steadily rising. Line usage charges have increased steeply during the recent past. Of around £12,500 spent by the college last year, about 25% went on line charges. A further £2,500 or so was spent on terminal rental. While expenses could have been reduced by renting a dedicated line to a single bureau it would also have entailed a sacrifice of flexibility.

A counter argument that appeared, at first, to carry considerable weight, was that a change to an in-house system would preclude the use of the large libraries of packages available through time sharing bureaux. Hutchings and his assistant, Sheila Birrell, however, found that only two or three such packages were used frequently and even these had been modified to suit the college's particular requirements. Nor, of course, would the acquisition of an in-house system rule out the occasional use of a time sharing bureau for, say, research.

A strong argument in favour of an in-house system was availability. Almost all time sharing services operate only during office hours. This was inconvenient for Ashridge, since teaching does not end until 9 pm each day. To arrange timetables so that terminal demonstrations were given between 9 am and 5.30 pm was not difficult. But the only opportunities for students to use terminals informally, either for study or recreation, occur during evenings or at weekends.

Why, specifically, the PDP-11/34? It would be unfair to imply that the Digital Equipment system was chosen by default. In the evaluation into minis in the £30,000 to £25,000 bracket showed that the PDP-11/34 was admirably suited to the college's requirements. The hardware was known to be reliable and the Basic-Plus compiler a good one. There was also a possibility of future co-operation with the manufacturers in writing new software.

On the other hand, competition for the order, which one might reasonably expect to be considerable in view of the college's high reputation and the opportunity of exposure to so many management students, was disappointingly small. Hutchings reported. Some companies did not respond at all to requests for information; others sent sales brochures which they did not follow up with a telephone call, letter or visit. At least one representative made an appointment that he never kept.

Whether this pathetic attitude, which was shared by

the US companies alike, was due to ignorance about the character of Ashridge, a belief that one potential minicomputer sale was not worth bothering about, or simply poor management, is anyone's guess.

The Ashridge PDP-11/34 is installed in a small room that was once a tinny food store, where it operates unattended. Its main features are 64K words of memory, half core and half MOS to allow automatic re-start after power failure, two

DECpack disc drives with 2.4 Mbyte exchangeable discs, a 180 cps DEC matrix printer and a DECwriter for console terminal. The current total of nine terminals includes teletypes, VDUs and portable units, which it will shortly be possible to plug in at many different locations. The existing two lines into the computer will soon also be increased to eight lines.

An interesting point is that the VDUs, which work at 9,600 bps over about 300 metres, are operating on only a single twisted pair of wires—which theoretically is impossible. Software includes the RSTS operating system and compilers for Basic-Plus, APL and Fortran. Now that there is an in-house

system, Hutchings is keen to develop facilities for its usage as a kind of superior pocket calculator for use by course members and others. Talks with Digital Equipment people are now under way on this, and on the possibility of developing further software for the extension of the problem-solving aspects of computing.

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Ashridge Management College.

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Services companies taking big strides towards success



**Tim Palmer's
Indian report**

DESPITE a rigid government framework which tends to be prohibitive rather than permissive, the Indian computer industry has taken major strides in the four years since Computer Weekly's last series of on-the-spot reports, and email and ambitious computer services companies have sprung up all over the country.

Nearly all the major mainframe and minicomputer manufacturers are represented by at least a handful of systems in India, and several, notably Univac, Burroughs, DEC and Data General have commis-

sioned Indian companies to write or adapt systems and application software for them. As enunciated by the Electronics Commission, the supervisory government body within the Department of Electronics which looks after the computer industry, the regulations under which business can be done in India are extremely restrictive.

However, the EEC delegation found that many things were being done by Indian companies which appeared to fall outside the guidelines laid down by the Commission, and the prospects for business are thus better than

they appear to be when viewed from New Delhi.

The state of development at the mainframe end of the industry is in sharp contrast with that at the microcomputer level: largescale mainframes in India, which include an IBM 370/155, two Burroughs B8700s and a DECsystem-10, as well as several Eastern European mainframes which match medium and large IBM 360s, are used almost exclusively in batch mode, and there is no data communication as yet because India's telephone facilities are inadequate and will probably

remain so until the first domestic communications satellite is launched in two to three years.

However, at the other end of the scale, several companies have designed and built microcomputer systems for business applications which are not a comparable state of development to those being built in Europe.

Noteworthy in this context is Hindustan Computers, which was incorporated only in August 1976, but developed in rapid succession a desk-top programmable calculator, a floppy-disc-based business system, an

electronic cash register and a key-to-minifloppy-disc data entry system.

The calculator uses the Rockwell PPS-4, a 4-bit micro and the other devices use the 8-bit PPS-8. The Intel 8080 is used as a controller for the Polish-built LX-180 printer on the business system, and a special floppy-disc drive controller was developed which allows a minifloppy drive to be used with one or two standard floppy drives.

In its first year of trading, the company sold 180 calculators and 45 business systems, chalked up a turnover of £1.3 million, and looks for £1.5 million in the year to March 1979.

Software development includes a proprietary language based on Cobol and confusingly called Basic, which includes input-output edit statements, and built-in sort routines, with the interpreter stored in ROM.

Hindustan Computers employs 400 people, 65 of them working on hardware and software research and development, and is keen to co-operate in Third World countries on projects involving writing software for the latest microcomputer hardware. It would also like to export its products to other Third World countries.

Government policy on joint ventures normally restricts the foreign holding in any new company based in India to 74%. In practice foreign companies are likely to have to fight to be allowed to have more than 40%, and IBM left India on June 1 because it refused to dilute its 100% holding. To get a larger stake in a joint venture company, the foreign organisation has to be bringing in advanced technology which the government deems essential to India's requirements, and to export a large proportion of the output.

Burroughs has formed such a joint venture with the giant Tata conglomerate, in which each party holds 50% of the shares. But Tata-Burroughs is exceptional: most US and European computer companies sell in India through agents and have no direct financial stake, and the first question the government asks is whether any foreign equity participation is necessary.

The government was unable to make clear its attitude towards the import of software, whether for use in India or for enhancement and re-export. Theoretically the rules are strict, and an import duty of 40% is involved; in practice a way may be found to circumvent this.

The rules governing the import and use of computers in India are also strict; the basic approach is that computer shall not be used for any application which displaces labour; their use is to be confined to applications which would either otherwise be impossible, or where the use of a computer confers a unique solution in terms of reliability or efficiency, as for example in precision engineering process control or airline reservations. On the other hand, apart from the State Bank of India, which does have a Burroughs B1728, there are virtually no computers in Indian banks.

The import of computers is tightly controlled by the Electronics Commission and appor-

val is only given once certain foreign exchange earnings conditions have been met, and then only when the computer is to be used for one or more of a number of approved applications.

Brundly, the approved applications are education, production planning, design, marketing, research and development, defence, aerospace and process control.

Companies are permitted to import computers for use in development of software for export, because this kind of work is being encouraged, but Catch 22 is that it is normally necessary to show that some export success has already been achieved before the licence is granted. Thus it tends to be easier for large diversified companies to import machines, such as Shaw Wallace in Madras, which brought in two Datapoint systems which will be used for software development and re-exported to Malaysia for a major plantation information gathering system.

The rapidly growing means of setting up a computer services company in India is the use by Indian nationals of capital carried abroad to buy and import a computer. Several of the companies visited by the EEC delegation were formed in this way, but the same restrictions apply: individuals are unlikely to get an import licence unless they propose to use the machine for something more than straight commercial bureau work for at least some of the time.

The import of expertise is another thorny subject, and in theory it is difficult for a foreign company to arrive in India with expertise or special knowledge to sell and find a buyer.

According to the government proposals for import, such "know-how" has to come from an Indian company, and a very good case has to be made for its necessity before an import licence will be granted. Import duties are levied at a rate applicable to the particular sector in which it will be used; computer sector imports carry a different rate of duty from petrochemical imports.

The impression left with the delegation by the government was that anything which was not actively encouraged was not possible, and that at least in the early stages of collaboration, procedures would be extremely slow and complex.

However, an intensive five-day tour of companies and organisations in Bombay, Madras, Hyderabad and Delhi presented a very different and much more encouraging picture.

Several companies had already built up valuable experience on overseas contracts, the range of computers, particularly modern minis, installed in the country is growing rapidly, and the era of data communications is dawning. There is even a company in Bombay in close consultation with Telesat about the possibility of effecting satellite access to the US communications company's packet-switched network.

Such a link would point up the irony that while it is possible to dial London direct from Bombay, there are people in Bombay who have been waiting for a telephone since 1968.

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Closing date: 16th June, 1978.
Applications in writing giving details of age, qualifications, experience, together with any other supporting information, and the names and addresses of two referees should be forwarded to: the Head of Personnel and Management Services, Halton District Council, Municipal Building, Kingsway, Widnes, Cheshire.
Municipal Building, Kingsway, Widnes, Cheshire. S. Turner, Chief Executive.

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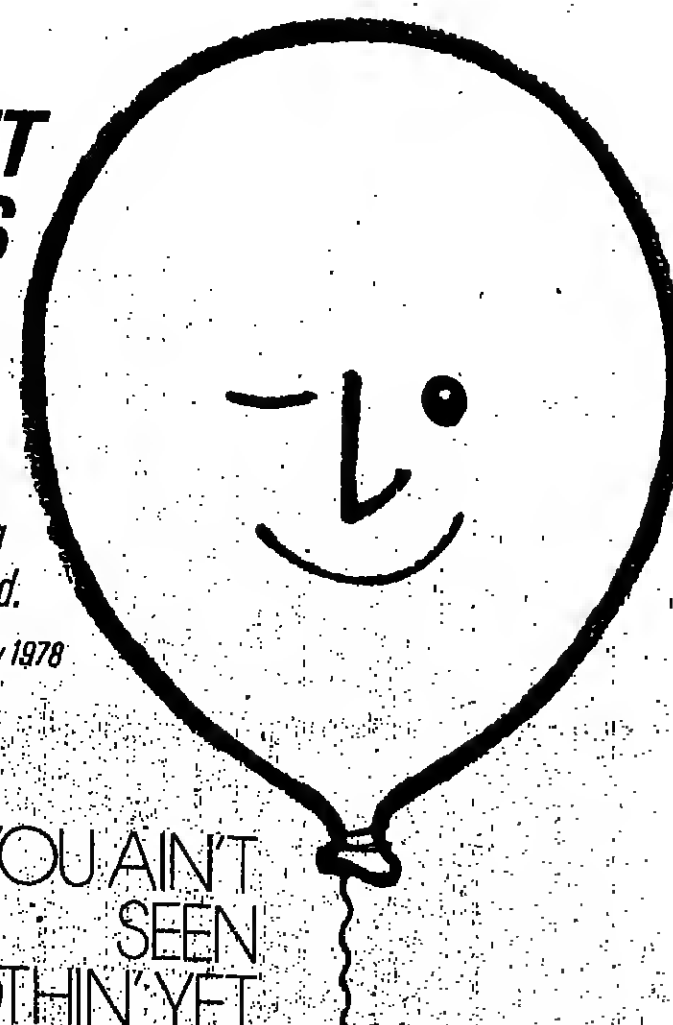
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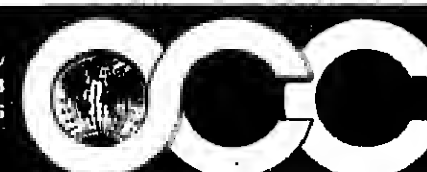
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Systems Development Manager

West London

c £6,000

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The ideal candidate will be at least 25 years of age and have several years' systems design and programming experience on small business machines. Local Government, property accounting and/or project leadership experience would be useful.

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Croydon

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It is anticipated that the positions which will be closely associated with the implementation of new systems will themselves offer the opportunity of some systems design.

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Applicants are invited from experienced BA1 programmers who wish to become system programmers. Candidates should be able to generate a DOS/VS system and have some experience of COBOL CICS/VS and power/VS. The duties will include the maintenance of the above products, performance tuning and the upkeep of other software as well as assistance to the system and development. Starting salary for both posts is £3,385-£4,214 (inclusive of supplements). The contract operates on IBM 370/135 and a DOS/VS. A variety of financial and financial applications are presented currently and it is intended to expand the existing self-programming system and introduce new data-based techniques. Application forms and further information from:

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Borough Treasurer's Department
P.O. Box 10, Watnall House, 35-37 Watnall Road
Bale H32 1AL
Tel. 061-255 8181, ext. 242
Completed forms should be returned to the Borough Treasurer by 15th June, 1978.

Your chance for Management

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BRENTWOOD, ESSEX a. £8,000
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SYSTEMS ANALYSTS

HERTS. a. £600-£800
Why commute? Why not take a local job offering similar salaries, fringe benefits and a better quality of life. Our client is a major installation based in rural Hertfordshire. They are looking for additional systems analysts at all levels of experience, ranging from virtual novices to those who have already made a major contribution to the implementation of at least one major system. Career prospects are good, fringe benefits attractive, and relocation assistance will be given. We certainly recommend further discussion.

SENIOR ANALYSTS

CITY a. £7000
Our client is a major U.K. shipping and container transport business. Their substantial investment in Data Processing is based on IBM 370 hardware providing extensive teleprocessing facilities. Business expansion and hardware growth are the contributing factors to their need for additional staff. Applicants should have at least two years' analysis experience coupled with some knowledge of on-line applications. The salary is attractive and fringe benefits are all you would expect from a company of this stature.

SENIOR BUSINESS ANALYST

LONDON a. £7500
A large software house, shortly moving to new premises in the West One area, is currently seeking a Senior Business Analyst, to join an expanding team of consultants. Applicants, who should be fully conversant with IBM mainframes, will have spent at least 5 years in Data Processing, at which at least 2 years must have been spent in a senior systems position. The ability to take a Director level is essential. This is an ideal opportunity for anyone seeking progression and responsibility. Remuneration consists of full travelling expenses, BUPA and twice yearly profit sharing scheme. Interested? Then call now for further details.

West London

SYSTEMS PROGRAMMER APPLICATIONS PROGRAMMER

a. £7000 a. £8000
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TO £8000
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ESSEX a. £7300
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CONSULTANTS

BALABY TO £11,000
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TRAINEES

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Wellcome

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On-line and batch computer systems are being developed to satisfy the data and test storage, retrieval and processing requirements of the SCU and the person appointed will also be responsible for programming and other local support to graduate staff in the design and development of such systems. Involvement later in other areas of scientific computing is planned.

The position offers the opportunity for a young man or woman, preferably with HNC qualifications in computer studies, to gain experience of all levels of project involvement. Knowledge of COBOL and FORTRAN on IBM 370 series computers would be an advantage.

The Laboratories are part of the Wellcome Group Research and Development and are concerned with primary pharmacological and control of insect pests. They are situated on the outskirts of Berkeley, a pleasant country town with good road and rail access to London.

We offer an attractive salary and first-class benefits include generous assistance with relocation expenses, where appropriate.

If you are interested, please write or telephone for an application form, quoting reference LAC 21, to A.J. Morris, Site Personnel Officer, The Wellcome Foundation Limited, Ravens Lane, Berkeley, Herts. Tel. Berkeley 4334, ext. 383.

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For further information, including data sheets on the company and its computer development, contact our CROYDON offices quoting CW18-8S

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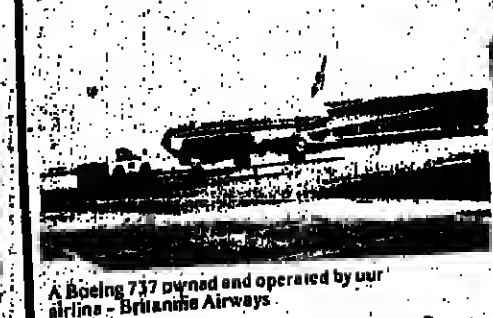
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Europe's biggest microfilm show comes to Wembley

THE biggest European exhibition of microfilm equipment, systems and services, Microforum Europe 78, takes place at the Wembley Conference Centre next week — from June 13 to 16 — and, as in previous years, there should be plenty to interest computer users.

Most major suppliers of computer output microfilm recorders will be there, and several leading UK COM bureaux are taking stands to talk about their services. An extremely wide variety of microfilm and microfiche readers and printers will also be on show.

Organised by the Business Equipment Trade Association, Microforum 78 will also include a one-day programme of seminars entitled "An Introduction to Microfilm." This will be held on June 13, and repeated on June 14 and 15, but not on June 16.

The morning group of seminars on each day, called Unit 1, is being aimed at the potential microfilm user and will cover subjects such as 16 mm roll film systems, duplication and how to choose a suitable format for microfilmed pages of information.

The afternoon session, Unit 2, is designed to augment Unit 1, and should be of interest to existing as well as potential users. Subjects will include computer output microfilm, methods of coding 16 mm film, jacket systems and aperture cards.

All presentations will be by representatives of firms in the business, including Kodak, Bell and Howell, NCR and 3M, and the fee is £19.44 for each unit and £34.58 for both.

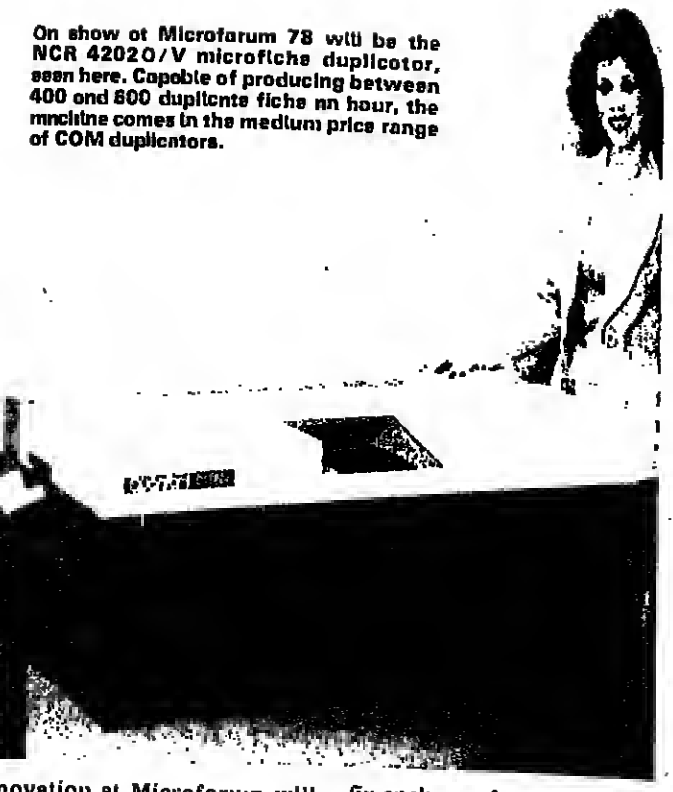
The exhibition has a £2 entrance fee and one of the more interesting demonstrations should be the live generation of microfiche by an NCR 643/115 COM recorder on the NCR stand. This has been done before by NCR at previous shows, but the big difference this year is that graphics will be merged with text on each microfiche.

The optical image combiner is available as an option on all NCR COM recorders with a microcomputer controller and is intended to solve the problems of firms that have to produce parts catalogues, engineering drawings and similar graphics on microfiche with text on adjacent frames or mixed with graphics on the same frame.

A system with the graphics merge option can take over this work from slow step and repeat cameras. It accepts graphics images on batches of 35 mm slides and can advance or reverse in order to select the required slide. No physical lens changing is needed to merge a graphics image with a frame of text filmed from the CRT in the COM recorder.

The merging of graphics with alphanumeric information will also be illustrated by one of the COM bureaux appearing at the show, Microgen, which will explain how using COM for this job can speed up the updating of records and remove the risk of out of date records being used. Microgen will also discuss its ability to produce COM output from data tapes, as opposed to specially formatted COM tapes.

Graphics and drawings can also be produced by the 3M Betacom 700H COM recorder operated by the RHM Centre



On show at Microforum 78 will be the NCR 42020/V microfiche duplicator, seen here. Capable of producing between 400 and 800 duplicate fiche an hour, the machine comes in the medium price range of COM duplicators.

COM bureau which will be at Microforum to discuss some of the advantages of its services. These include the COM software development facilities that it can offer on the IBM 370/158 run by RHM Management Services.

Another COM bureau, UCSD Datascom, part of Unilever Computer Services, will be talking about a new micropublishing service and will also be displaying a range of indexing and retrieval systems to help users make best use of microfilm after it has been generated.

Another interesting technical

Innovation at Microforum will be a system that can update individual frames on a microfiche. Called the A. B. Dick/Scott System 200 it can add new frames of information to a microfiche of random intervals over a period in excess of 25 years and takes only eight seconds to expose, develop and fix each new frame.

The system's manufacturer, A. B. Dick, says it can be operated as easily as an office copier and offers the user a true microform analogue of a paper filing system, with documents being annotated or cancelled as in a paper file.

Racal-Redac makes challenge in the CAD system market

MAKING a concerted effort to gain major inroads into the European market for computer-aided design systems, Racal-Redac spent last week in the Okura Hotel, Amsterdam, with an exhibition for potential European customers.

It also took the opportunity to preview two new systems that it intends to add to its product roster.

The first of these is a system for electronic circuit analysis, aimed at providing designers with the facility to construct, manipulate and test circuits before any commitment to hardware development. This allows designers the opportunity to evaluate several different hardware approaches to a particular problem, before settling on a solution.

The second system is for mechanical design, and is intended to provide a means of visualisation of mechanical design concepts. Initially, the system is planned for use on mechanical place parts, as might be found in the chassis of electronic equipment, but Redac has plans to extend the system to cover three-dimensional operations.

Both new systems are based on Digital Equipment PDP-11 hardware. Redac now having standardised on this manufacturer's products.

They joined the company's existing product range in the show, which had versions of the Redac Executive, the integrated circuit design system, the Mini printed circuit board system and its new big brother, the Maxi. This is essentially the same as the Mini PCB system, having a higher graphics display capability offering higher circuit throughput.

UK telephone bills fall below the average, claims Logica

TELEPHONE bills in the UK are about six per cent below the average for Western Europe, according to an index produced by Logica from information gathered for its Tariffica service.

The index provides only a very simplified basis for comparing one country with another and one year with a previous year. A more sophisticated index may be produced in the future, Logica says, if there is a demand for it.

Tariffica has been used to provide details of European telephone services, regulations and costs for over a year and the client list includes PTTs as well as such organisations as Lloyds Bank, Esso, Nippon T&T and Reuters. Logica will use the data to compile the next Eurodata survey (CW, March 9).

Now into its third edition, Tariffica is available as a looseleaf book of 325 pages, updated several times a year, at £4.00. Logica offers a Tariffica Club Service which costs £1,750 to join plus £70 a year. This includes two copies of the survey plus updates, inquiry and news bulletin services and low-price extra copies and special editions.

Andahl installations

THE US House of Representatives has installed two Andahl 470V75 mainframes on lease for four years, to supplement its information system.

New Kiosko offices

NEW offices in Manchester have been opened by Kiosko Data Systems at Circle House, London Road, Chorlton.

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Meeting the needs of the banks

By **MICHAEL EDWARDS**

Computer manufacturers and the major banks have often developed their own strategies in relation to the latest technological developments, says Michael Edwards, who is executive manager, marketing, of Gamm Associates' Financial Systems Division. It is with some relief that he now notes a coming together of banks with manufacturers to discuss future systems development. But he adds, "We are still a long way from any rapid change."

TOO often computer manufacturers have tended to plan their products around the latest technological developments, whereas the major banks have based their systems on somewhat conservative hierarchical organisational structures. Thus the two have developed their own strategies, "banding" when necessary the technology to fit the application or the organisation.

This principle has worked to a limited extent but often at considerable cost in response time or in comparison to the usual manual methods.

It is with relief, therefore, that we can now see a coming together of banks with manufacturers in discussing future systems development. But we are still a long way from any rapid change. In the main, banks are relatively rigid institutions which cannot effect necessary organisational changes to satisfy the latest hardware developments. Nevertheless the need to stay competitive remains and development has constantly to be directed towards computerised methods.

Hundreds of thousands of transactions are performed daily, servicing millions of accounts. Payment systems vary from country to country; money transfers have to be effected rapidly and as the supply of clerical labour shrinks, the cost per transaction continues to rise.

And there are many other applications for which computer solutions will be sought. These range from paperless clearing between banks, automatic teller machines, touch tone and viewdata, message switching, point-of-sale terminals and word processing.

Paperless clearing between banks is particularly interesting and there are likely to be significant developments, especially between countries.

Many automatic teller machines are already in use in individual banks, but banks will consent to install joint ATM networks.

In the area of touch tone and viewdata, banking from home has already been tried and is likely to continue. Message switching is already widely used by many banks, particularly those operating internationally.

Now we come to point-of-sale terminals. The Interbank Research group in the UK is already fairly advanced in the functions required to provide direct debiting in retail outlets. POS is not technically difficult, but it still needs public acceptance.

In word processing, secretarial work is increasingly being automated. Considerable information is held on data processing databases, and simple, user-designed terminals which access those databases provide not only internal efficiency but offer an electronic mail alternative to hard copy mail.

Although there can be a coming together of the institutions and the manufacturers, there still remains the bridging of the gap between the individual user and the in-house technologist. In this respect there are two main considerations. The systems have to be more user oriented and the user should be "protected" from the operating environment.

Clearly a new approach is needed if the continuing growth of paper recording is to be contained.

Designing a banking system raises the argument between reliability and availability. Manufacturers talk of reliability being 90 to 95% based over a 12-month period, but that could be achieved with a total computer "black-out" for three days. What is important to a bank is availability. Not only must the hardware be "off the air" for a minimum of time, but also when repair has been effected, recovery should be simple and speedy.

Much time and effort has been expended in tuning a system to increase availability, only to be thwarted by the next version of operating system or central processor being incompatible. Software should be transportable, particularly as the cost of hardware continues to decline and software costs therefore take on a larger percentage of the overall system cost.

As hardware costs decline, so also does the overall share of the system provided by the vendor. This supposes that the involvement of the manufacturer moves still further away from the application and the latter's responsibility for the reliable operation will rest still more on the bank's management. Use of standard hardware and software from the manufacturer wherever possible becomes imperative.

How, then, can a bank provide all the latest tools to its users to facilitate their function without sleeping them in the day-by-day terminology of computers?

It is quite clear that future banking services will still require databases to be maintained at one central site, but the information contained at the site will require easy, timely access by a user at a remote terminal. Twenty-four-hour-a-day, seven days-a-week operation demands, together with a reducing number of working hours will push a bank to real time computer operation more quickly than it would like, and the complexity of transactions handled by the system will increase.

And what of security? Large batch machines will not answer all the requirements for the future and microcomputer manufacturers like DEC have made great inroads into the real time banking world. Front ending to back office machines with online applications like foreign exchange, funds transfer, security accounting, Eurobonds, etc. the mini provides a more adjustable machine to mechanise remote branch applications.

In essence then I am saying that banks require computer manufacturers to provide systems that are transaction oriented; provide availability and reliability; security and privacy; compatibility; database and file management systems; network ability; recording and restore facilities; maintainability; and user oriented.

It would seem that only DEC has gone very far to provide just the sort of requirements listed above. The recently announced TRAX (CW, June 1) is a complete operating environment designed for online transaction processing. Application programs written on one TRAX system can be run unchanged on another. It is a high performance system with multidrop block mode terminals, powerful recovery system capability, communications functionality, high level language compiler and a forms language to support fast and inexpensive program development.

From the security standpoint, users cannot access the operating system. The terminal is entirely transaction driven and guards against unauthorised activity with user sign on, passwords and identity codes. It also has user and terminal work stations that define what transactions are available to a user of a terminal. TRAX utilities log hardware and software errors to help provide increased up-time.

Banks without technical resources will become increasingly dependent on specialist systems and software houses to provide the technical and managerial skills for applications engineering. In this capacity the large OEM can influence the manufacturer in future product strategy giving added weight to the requests and needs of the banks.

The large European banks which the manufacturers tend to treat as being the same as the US banks in terms of data processing — which they are not — generate their own needs based on the large mainframe approach. Nevertheless, since they too are looking to distribute processing, albeit across a greater number of smaller machines centrally located, the requirements will be comparable to those of smaller banks.

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How to avoid chaos when your data network crashes

By Ray Northcott

SOME months ago, on the way back from a business trip, I arrived at the airport at the time designated for check-in.

Reaching the head of a long queue, I handed my ticket to the girl on the counter and watched appreciatively as she keyed the information in with a confident smile.

Suddenly her smile wavered and finally disappeared altogether as her terminal refused to respond.

There then followed a period of some 20-30 minutes total chaos. Airline staff rushed about in confusion and talked in agitated whispers down the telephone while the equilibrium of my fellow passengers began visibly to disintegrate.

When, after some heated conversation, a man who appeared to be in authority, came along and tried to implement the stand-by manual system, several of the girls admitted that they had never used it before and the ensuing education programme contributed to the problem by wasting more valuable time.

The story of this frenetic morning's disruption serves to illustrate the need for proper management and control of data networks.

In this case, the users of the system should have been properly briefed on their role in the case of such an emergency and consequently better able to cope with authority and calm.

During the past few years, the growth in terminal population in the UK has been phenomenal. The forecast figures, produced last year by Pectel for the Eurodata Study, predict that by 1985 we shall have 400,000 terminals installed and these figures are accepted to be on the conservative side.

If the recent swing to distributed computing and the success of the minicomputer are taken into account, it is easy to see that data networks are increasing both in their number and in their complexity.

The majority of small and medium-sized organisations, particularly those that operate a simple star-configured network,

"If the recent swing to distributed computing and the success of the mini are taken into account, it is easy to see that data networks are increasing both in their numbers and in their complexity."

minimise the number of suppliers involved to two — the computer supplier for the mainframe and terminals and the Post Office for leased lines and modems.

However, the constraints and possible cost disadvantages that single supplier solution can impose may dictate a more adventurous approach to achieve a cost-effective network.

This could mean the introduction of terminals from third suppliers, the hardware/software products for data networks provided by the

minicomputer suppliers which can be interfaced to other manufacturers' mainframes.

The operator of a more complicated network may look to the specialist suppliers in the data communications field who can provide the equipment which will maximise line utilisation and network efficiency such as multiplexers and concentrators.

In any event, the Post Office will always be involved, except in the case of an organisation like British Rail, which has its own independent telecommunications network.

In order for any network to function effectively, special techniques and skills are required to maintain it, and although these may vary with the size and complexity of the network concerned they must be incorporated into the overall DP planning if disruption is to be avoided.

First, the network should be secure against equipment or line failure. This means that sensitive areas of the system should be identified and the consequences of failures occurring in these areas assessed.

Sensitivity can range from the need to provide duplicate lines and equipment which can be introduced immediately on any failure occurs by means of remote and/or local switching facilities, down to failure which can adequately be covered by a return to manual working for a limited period, known colloquially as *bottoms* — back on to the old manual system.

The second feature which is crucial to the smooth operation of a data network is the implementation of reliable diagnostic techniques which will facilitate rapid isolation of faults. Of course, responsibility for repairing faults will depend upon maintenance contracts negotiated with suppliers or, in some cases, it will fall upon staff employed by the user organisation.

However, it need hardly be said that if faults can be pinpointed swiftly, correcting them becomes a far simpler and cheaper task for whoever has to do it.

Diagnostic techniques sometimes employed can include the use of special test equipment to investigate signal amplitude, signal distortion and noise of both impulsive or continuous nature.

In addition, remote switching capability allows loopbacks and the isolation of suspect parts of the network. This switching capability can then automatically produce test by equipment in the offending area.

In some cases, operators of network equipment, specially designed software which provides listening capabilities and a means of allowing remote technical staff to carry out some initial investigation and identification of faults on terminals and modems.

Once the system is as secure as it needs to be against breakdown and effective methods exist for finding faults should they occur, it is advisable to establish a programme for

monitoring the status of the components of the complete network.

Up-to-date knowledge of the condition of the lines, modems, terminals and other devices may well allow maintenance to be effected before a fault becomes visible to users.

This monitoring programme will also ensure that standby equipment or lines are operational.

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deduced to employees who may well view such a device with scepticism if not actual hostility.

Chaos in the early stages of online working, resulting from superficial or poorly thought-out commissioning procedures, will undoubtedly erode the credibility of the network. Such credibility can be hard to gain, and almost impossible to establish if initial performance is

concentrating merely on data aspects.

Some of the questions that might require careful consideration are:

1. What is the total telecommunications traffic between two points on the network likely to amount to at the time of commissioning and in the foreseeable future (data, speech, facsimile etc);

2. What is traffic distribution across these sectors likely to be;

3. What level of service is acceptable for each of the various facilities; and

4. At what speed will data be transmitted?

In practice, it is often preferable to develop the data network and achieve satisfactory operation and control and then turn attention to rationalisation of the total telecommunications facilities required by an organisation by first gathering comprehensive traffic statistics.

Such investigations may reveal worthwhile opportunities for simultaneous speech and data transmission on one leased circuit, or perhaps the use of this facility for speech during the day and data or facsimile outside normal office hours.

As I said, first-hand at the airport, a failure which might stay as a mere inconvenience can become a major disruption if the users of the network are not provided with adequate support.

The girls at the desk had no idea of what had gone wrong and whether it was being attended to or how long it would be before the system would be restored.

In addition, they were completely unprepared for implementing the standby system.

Thus it is vital to ensure that all users of the network are provided with adequate documentation on what action they should take to reduce the effect of faults.

Responsibility for the programme mentioned above

ideally, the network controller should have a thorough knowledge of data communications and a good appreciation of telecommunications in general, and software in the areas of telecommunications, diagnostics and statistics.

Strong technical background and management capabilities are also essential if effective liaison with the Post Office, equipment suppliers and users is to be established and he or she should be aware of opportunities for improving the network afforded by business and technological developments.

Clearly, such an individual will not be easy to find and it may be necessary to supplement experience with selective training.

Finally, it is worth stating that network management and control can be as simple or sophisticated as business requirements and network complexity dictate.

However, it should not be considered as a subject of interest only to organisations with large networks as there are worthwhile benefits to be derived from establishing sound procedures even in the smallest network.

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Hanging helplessly on to an unresponsive telephone is one of life's most frustrating and frequent experiences these days, writes Laura Tatham. The conventional telephone equipment, however, is incapable of optimising the distribution of incoming calls among a group of extensions and a more sophisticated computer-controlled system is effective, but too expensive for most firms.

System that streamlines distribution of incoming calls

By Laura Tatham

HANGING helplessly on to an unresponsive telephone is one of life's most frustrating — and frequent — experiences these days. In theory, one should ring off and start again rather than wait a connection which, for some unknown reason, has not been made. In practice, especially when the call is handled by a busy switchboard, it is so difficult to get through again that to hold on seems the lesser of two evils.

The flow of adrenalin triggered in such circumstances bodes ill for the luckless person who eventually takes the call. This is particularly unfortunate when the object is to place an order, since efficiency in this area often gives a company a competitive edge. The telephone bottleneck also seems peculiarly absurd when the order recording process itself has been streamlined by the use of online terminals.

Conventional telephone equipment, however, provides no answer to the problem, for it is incapable of optimising the distribution of calls among a group of extensions. More sophisticated computer-controlled systems are effective, but too expensive for many but the largest organisations. A new

minicomputer-controlled system called ACD 5000 offers, for the first time, a solution for the small user. Designed and manufactured by the Norwegian telecommunications company, Gustav A. Ring (whose Ringmaster Intercom equipment is well known in the UK), it can prove cost-effective for as few as five operators but can also accommodate up to 200 working on between 10 and 160 lines, the company claims.

"Ideally, the network controller should have a thorough knowledge of data communications and a good appreciation of telecommunications in general."

During uneventful waits, callers are reassured by recorded music or messages and the operators find their job a lot less stressful.

This contention is certainly supported by the experience of Aftenposten. One of Norway's best-read newspapers, which is published morning and evening six days a week, it derives an annual revenue equivalent to \$30 million from its classified ads. These, which on a busy day may number up to 1,700 and emanate from quite a wide geographical area, are almost all dictated over the telephone. A

total staff of 68 operators in the Classified Department works in shifts from 7 am to 6 pm on weekdays and for three hours on Sunday evenings.

Until recently, it was disappointing to the supervisor, Mary Carstensen, that even her highly trained staff could not always provide first-class service. This was because incoming calls came through conventional telephone equipment which had no queue management system. A local caller might therefore be connected immediately while someone who had rung earlier on long distance was still waiting for attention. Undoubtedly, some disgruntled callers rang off after a while with consequent loss of business.

For operators, the job was nerve-frazzling. Bells jangled continually. An important part of the service is to advise customers on the wording of their ads, but while the girls were doing this they were uncomfortable aware of the constant flashing of the 24 signal lamps on their desk panels which showed that other callers were waiting.

Mary Carstensen therefore welcomed the opportunity to become the world's first user of the Ring ACD 5000 equipment.

This was ordered on her recommendation after she had satisfied herself of its potential usefulness and discussed it with her operators. Before its delivery, she also provided useful suggestions to the Ring engineers on features to be incorporated into the supervisor's and operators' panels which, with other system characteristics, can be tailored to some extent to meet the needs of individual users.

Modularity of design is a key feature of the Ring ACD 5000 system, which is offered as a complete hardware-software package. Including the telephone switchboard. At its heart is a Computer Automation Module Mini. This automatically distributes all incoming calls, giving priority to certain categories if required; continually monitors the performance of all equipment, diagnosing and reporting on faults; can automatically interpolate pre-recorded messages after a given wait time; and collects and analyses a variety of operating statistics.

Software for the system was written jointly by Ring specialists and members of the computer department of the Trondheim (Norway) Technical University. This team optimised the original operating system to suit the requirements of the ACD 5000 and programmed all the functions outlined above. Since the system is "finite" — that is, every possible state can be predicted — all the programs are table-driven.

The computer memory can be expanded from the basic 16K required by the software. How many increments are added is determined mainly by how much statistical information the user wishes to collect and how often this is dumped — onto a central printer under the control of a real time clock; and/or to the supervisor's panel.

The surface of the stations provided for individual operators is only about 34 by 64 inches and the equipment may be set flush into a desk, as has been done at Aftenposten, or be freestanding. Each station contains a 12-key dialling pad, four control keys and six display windows. A lid placed over the top when not in use incorporates a stud that, by pressing on a button immediately below it, automatically notifies the computer that this position is not working. A lightweight headset plugs into a jack.

An operator in the Aftenposten Classified Department demonstrated the system with evident enthusiasm. On arrival at her desk, she explained, she removed the lid from the panel and pressed a button which lit a lamp in one of the display panels

and clocked her into the system. The arrival of a call was signalled by the flashing of a display lamp and accepted by pressing another button. By doing this she notified the system she was busy and it changed the display to show the origin (line group) of the call.

A feature she specially liked was that the system would not present her with a further call until she had signalled her readiness to accept it. This allowed her to finish all the work

"Bells jangled and fights flashed continually, the job was nerve-frazzling for the operators as well as for the girls advising customers on the wording of their ads."

connected with the call (which might include looking up references) without being harassed. A glance at an illuminated wall panel visible to all the operators would, however, show her how many calls were queuing in the system as a whole.

Transfers of calls through the main switchboard to other parts of the building is equally simple: an incoming caller who wants to talk to a specific operator can ask whichever girl the system selects to transfer him, who he will be put through at once or wait if she is engaged at the moment.

Mary Carstensen was impressed with the amount of information the ACD 5000 system provides. Her panel, which

has a layout identical to those of the operators, plus extra display positions, will show on demand how many calls are queued, how many operators are present and actually working and how many free at that particular moment.

Seventeen different types of report and analysis can be shown on demand and are also automatically printed each hour. Typical examples are: how many calls have waited up to 30 and up to 90 seconds for attention (the intervals were selected by Ma Carstensen); average time spent in talking and in post-conversation work, in total and per operator; how many calls were abandoned; the percentage of time that all lines were busy.

The loss of these, used in conjunction with the figures on wait times and line utilisation, indicates if line capacity is adequate. Another report, showing the calls of forced per line, reveals when a line is out of order (which goes undetected with conventional equipment).

For local callers, waiting time is always minimal, for the system distributes on a first come, first served, basis except for long-distance which automatically gets priority. During unavoidable waits, callers are reassured by recorded music or messages. Operators find their job a lot less stressful and the room in which they work is almost unenviably quiet.

The Norwegian Telecommunications Administration has approved the Ring ACD 5000 system and will shortly be using it to improve its own service to subscribers.



An engineer at the computer with the phone equipment in the background.



A woman at the station.



An operator with the layout of the keypad.

CHRISTINE HARVEY PROVIDES AN INSIGHT INTO SOME FEMININE SUCCESS STORIES....

Christine Harvey, feature writer and advertising sales executive in the US before moving to the UK, is now herself contemplating the possibility of moving into

the software sales field. "As a result of talking to recruitment advisers, I became intrigued with the apparent minority of women in the computer industry

in this country. I decided to investigate the situation, and discovered that while their percentages may be low, one would certainly admire their success stories.

The enthusiasm for their work was striking in every way," she says. In this article, Christine provides an insight into the experiences of these women.

How women compete in the computer industry

AS women climb the ladder of success in industry, a new image of the career woman is emerging to replace the old one, which sometimes denoted a certain callousness slanted toward masculinity. No longer are women feeling that they must give up their femininity to be successful. In fact, many of the previously repressed so-called feminine traits are now thought of as being essential to success.

A Harvard Business School survey which substantiates this, examined 25 of the most successful businesswomen in the United States. Their results showed that these women dis-

played a true working balance of masculine and feminine traits. Their intuition to size up people and situations quickly, their attention to detail within the total picture, and their genuine concern for people, were all qualities which they brought to their positions in upper management.



MARIAN CARNEY... "Judging personalities is an integral part of resolving problems."

played a true working balance of masculine and feminine traits. Their intuition to size up people and situations quickly, their attention to detail within the total picture, and their genuine concern for people, were all qualities which they brought to their positions in upper management.

Although women occupying senior positions in the computer field are still in the minority, many of those who have entered it have an interesting record of success.

Faye Ogilvie, director of Management and Executive Selection, has a favourite story about a woman she placed in the computer sales field several years ago. "This woman was so successful that her company hired a chauffeur-driven car for her to see her clients," she explained.

In another case, Faye had placed a woman with the company and after three years the boss called her with a plea: "Can you help me fill her spot with another woman? She's moving abroad with her husband, and she's done such a tremendous job, I don't think her clients will accept a man in her place. I want to fill it with another woman."

Faye feels that women often have the edge over men in sales. Firstly, they get their foot in the door more easily, simply because of their uniqueness in the field. The next step is convincing the client of their technical competence — and the rest is smooth sailing.

Of all the fields in the computer world, selling seems to be the one least penetrated by women. Kay Law, the first woman in sales in the Page Printing Systems Division of Hoeveywell, feels that there is a myth still circulating about the sales field. "If more people understood the true scope, I'm sure more would get into selling," she says. "It requires much the same skills and competence as other aspects of computing."

While she agrees that being a woman opens doors to her, she points out that this can sometimes be a hindrance. "While my colleagues accuse me of having prejudice working in my favour, I argue that it also creates a time-wasting factor. Because women in this field are such a rarity, men sometimes make appointments just to see

what a saleswoman is like, with no intention of buying."

For the most part, she finds sales very rewarding. Getting to know a lot about a large number of organisations and being able to analyse their problems makes the job highly enjoyable for her. "There is intrinsic delight in selling," she says. "There's tremendous satisfaction in building up the business every step of the way, then going to see the equipment in use and of benefit to the customer. Success in selling is largely due to the building up of the customer's confidence in you."

All the women interviewed felt that being a woman was a definite advantage in their field. They preferred, however, to think of themselves simply as a person doing a job well. They all implied that they were not "women's libbers."

Sonye Howell Jones believes so strongly that it's an asset to be a woman in today's competitive world that she says, "If you have sound reasoning and good judgment, you can use your charm as the final straw."

She objects to the prevalent connotation of the term "career woman". While her career is important to her, she would not work in a field that she did not find rewarding. In her present position as manager of marketing communications at Data General, she finds satisfaction in the diversity of her responsibilities. "It's an industry that's fun to be in and it stretches one to the maximum."

With the pressure of deadlines, and activities leading up to trade shows, time is always in short supply. There are constantly issues which must be addressed. "You are ultimately forced to get your own answers after weighing up the alternatives. These answers may come to you in the middle of the night or after many days of concentrated planning."

As regards being a woman in today's marketplace, her philosophy is, "If you have the required background and ability, you should fight for a piece for yourself."

While being interviewed, most of the women expressed the view that women had a highly developed understanding of people that helped them in problem solving situations.

Marian Carney, DP manager at Richard Costain, the construction group, feels that this is an advantage in her position, working closely with people and sharing ideas on the perception daily when facing people across the desk. She finds that judging personalities is an integral part of resolving problems.

When asked how her male counterparts reacted to her initial promotion into management, Marian reflected that she was senior to the others in her group, so when the promotion came nobody protested. The only abnormality was that everyone who would be working for her was asked if they minded working for a woman. But she could not recall ever being consulted on her reservations as a new manager in her department. "Even my secretary, who joined us two years ago, was asked by personnel if she objected to working for a woman." Later, she told Marian that she thought it was a ridiculous question. Regarding the shortage of

programmers, Marian feels that employers must rethink their hiring policies. "Many are still afraid that women will quit to have a family, but the risks are just as great that a trainee will quit to move on to a better paying job." To resolve this problem she thinks that they must take the necessary risks of

hiring both young people just out of college, and women.

"Women," she says, "have an eye for detail which makes them particularly good in the programming field."

The others interviewed felt that women in general had a keen eye for detail, which does not make them lose sight of the

overall picture.

Christine Stott, sales promotion manager for Casc, went so far as to say, "I suppose I'm a chauvinist in reverse. It's not that I would mind having a man work for me, but I haven't interviewed one that I felt was as attuned to detail as most women are trained to be. I just don't

have the time to pick up the pieces for them. Also, one is very conscious of the fact that men have constraints towards working for a woman which is a source of concern."

She feels that we still have the problem mentally of putting female executives in the wrong role. "In a new group situation,

it's assumed that I'm the secretary."

She so feels that women could use their talents to make us a very successful in the computer field, and to be very successful in it. "I find it very disappointing that many women are in senior positions who could be using their potential to

a far greater capacity.

"There are disadvantages that must be overcome in this business. First, it takes women longer to establish credibility. Second, they must always be prepared to walk the tightrope between femininity and professionalism. Also, they must take the same attitude towards work as men do, including working late and taking business luncheons for granted," Christine commented.

As men and women both move towards the middle line of total person, or what psychologists now call an androgynous personality, we should be able to anticipate a more productive and compatible working environment.



CASE STUDY-1

Steer clear of technical jargon

FOR Christine Stott, sales promotion manager at communications systems supplier Case, total involvement is the name of the game. She points out that women must take a different attitude toward their career if they expect to be promoted. This includes long hours when necessary, and lunchtime dedication to the business. "In other words," she says, "they must take the same attitude as men do if they expect the same rewards."

CHRISTINE STOTT... "I suppose I am a chauvinist in reverse."

Christine started her career with a scientific background in biochemistry, with her first position as a technical officer at the Chemical Warfare Establishment at Porton Down. She moved to the Lister Institute, and then on to a recruiting position with a scientific personnel agency, where she developed an interest in computer placement.

After her marriage she took a three-year break in her career. "When I tried to return to the industry, the recruitment people treated me as though I had been dead for that length of time."

She found this disturbing, but persisted in her job search and found that once she had got past the recruiter and into the actual job interview, the situation improved.

She was offered a position as a call dispatcher in the field engineering department at Case which mainly involved dealing with customer problems. This insight into the company, its customers and its engineers, led the way into sales promotion. Now heading the department, reporting to the managing director, she has a personal

assistant, and a secretary to help her with a diverse range of promotional activities. These include preparation of both technical and sales literature, Press interviews, exhibitions and a company newsletter.

In a position with as much diversity as sales promotion, it is difficult to select one function as more important than another. Success in promoting the right image for the company is one of the main sources of satisfaction for Christine. Ona can see evidence of this from a successful exhibition.

Feedback from seminars, held about once a month, is another measure she relies on.

The biggest problem she sees in her side of the industry is in educating the marketplace. To do this successfully, she feels one must try to avoid using technical terminology wherever possible. Knowing where to strike a happy medium is the difficulty.

The important thing, she says, is that the customers need to be made aware of what they could be doing rather than what they are doing.

CASE STUDY-2

Job satisfaction top of the list

MARIAN CARNEY, DP manager at Richard Costain, started her computer career when, after "A" levels, she was recruited by ICL (then ICT) as a trainee programmer. She has always been well received by prospective employers, and does not feel that there has been any prejudice towards her as a woman.

After two years with ICL, she moved to BICC as a programmer, was promoted to senior programmer, then moved to Costain, as a systems analyst and design trainee. She has spent the last nine-and-a-half years there, the most recent two-and-a-half years in management.

Initially she had no aspirations towards management. "I am the type of person who likes to do a job well, and I'm flexible about accepting different responsibilities as they come along."

When considering all aspects of her career, Marian places job satisfaction at the top of the list. She finds close-knit team efforts the most rewarding. "One example of this dates back to when she was a project leader. She recalls the team spirit that existed in the weeks just before an accounting system went live, with programmers and accountants checking the results. The sense of accomplishment that everyone felt was tremendous. There is also satisfaction for her in knowing that the system is still operating successfully now, six years later."

From a management point of view, Marian says that she likes her people to be technically competent. "If I pick up a pro-

gram that is written particularly well, I get a sense of satisfaction out of knowing, I suppose, that I am partially responsible, especially if that person has been with me a number of years and is performing well."

The key to success in a project, she firmly feels, is being able to rely on good communication. This includes trust, and having respect for others' opinions.

One of the biggest problems the industry faces today, she feels, is a shortage of trained personnel. "During the economic crunch of three or four years ago, companies just stopped training programmers, and we are now feeling the effects; also, the high wages offered by the software contract houses make it rough for our type of company to compete. This creates a situation where one must struggle to keep one's own staff."

The immediate compromise which must be made, she thinks, is to move people around internally, or in some cases take on people with less experience than desired, and advance them as quickly as possible into positions of responsibility. "Employers must re-establish training programs to solve the needs of the future," she says.

Keeping in touch with people in the industry is important to Marian, and she finds attendance at the ICL Users' Convention useful for that reason. She has also found that attending various project management seminars, systems analysis and design courses, and ICL courses, has kept her up-to-date with the latest technology.



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The successful candidate will be responsible for the technical development of an integrated computerized report and management information system, including the design and development of the system's software and hardware. The University has ordered an IBM 4341 computer (PDP 11/24) for delivery in July 1978. Further enquiries will be welcomed from the Systems Analyst/Programmer in the post.

Applicants should be able to demonstrate a background in the development of integrated data processing systems with experience of microcomputing and knowledge of PDP 11 technology.

Initial appointment will be made on a fixed term basis of 12 months (12/1/78 to 12/1/79) subject to satisfactory progress in the post. The post is a full-time position and will be reported to the Dean of the Faculty of Science.

Applicants should be able to demonstrate a background in the development of integrated data processing systems with experience of microcomputing and knowledge of PDP 11 technology.

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ATC Display Systems-Saudi Arabia Programmer/ Analyst £18,600 tax free

Lockheed Aircraft International is involved in the provision and maintenance of a sophisticated Air Traffic Control network in Saudi Arabia. The systems make extensive use of computer techniques and this appointment will carry responsibility for the software functions relating to computerized display systems.

The work is varied and interesting. It covers modification of software programs; assisting DP Technicians in failure analysis by developing and running specialised diagnostic programs and updating software program library.

Essential requirements are a strong mathematical background and at least three years' experience in small systems, general purpose programming with the emphasis on engineering applications, although some business programming experience would also be useful. A good knowledge of FORTRAN, COBOL and/or Machine languages is necessary and, ideally, some ATC experience.

Lockheed have recently increased their salary and benefits substantially for these posts providing:

- * annual salary of at least £7,300;
- * cost of living allowance approx. £200 p.a. paid monthly;
- * a bonus payment of £500 every six months culminating in an end of contract bonus of £2,500 totalling £4,000;
- * three paid leave periods with three free flights home to the U.K. annually;
- * free bachelor accommodation, food and laundry;
- * free medical care and life insurance.

There are excellent prospects of employment beyond the initial two year contract period.

Write with brief details, quoting Ref. 284, to International Aeradio Limited, Aeradio House, Hayes Road, Southall, Middlesex. Telephone: 01-574 5000.



MYRIAD APPOINTMENTS LIMITED

Computer Personnel Consultants

SYSTEMS ANALYST

BEDFORDSHIRE

£5400 to £8200

An experienced Systems Analyst is required to augment a project development team within the expanding Management Services Department of a major British manufacturing company.

The successful candidate will be keen to take project responsibility and play an active role in an exciting phase of the Company's growth. New applications include Work-in-Progress and Variable Costing systems to monitor performance in production areas, together with Budgetary and Forecasting systems for remote manufacturing cost centres.

Applicants should have an awareness of general business issues and enjoy a changing environment ranging from involvement at shop floor to directorial levels. A flexible approach and the ability to analyse and recommend solutions to business problems is considered more essential than a technical background.

This is an outstanding opportunity for career advancement within a progressive organisation offering comprehensive fringe benefits including Free Pension, Life Assurance, Sports and Social Club facilities and four weeks' holiday. Where appropriate generous relocation expenses are available.

Ref. NJ.0806

24-hr. answering service
Please telephone for a confidential
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01-353 0981

SYSTEMS ANALYST SURREY

Starting Salary c. £5,500

International company engaged in manufacturing, distribution and sales of Dental products requires a Systems Analyst to join our D.P. team at our Watlington-Thames computer centre.

The successful applicant will have proven expertise in designing and implementing at least one major system and will be prepared to work in a team environment.

Our current hardware is an ICL 2904 and a knowledge of ICL COBOL and Software would be an advantage.

Applicants are invited to write to:
A. E. Wicks, DP Manager, A.D. International, D.P. Department, Churchfield Road, Watlington-Thames, Surrey.

LONDON BOROUGH OF ENFIELD

Computer Operator

£2,860-£3,282

Applications are invited for this vacancy in the Borough Treasurer's Department. The successful applicant will be required to assist with the operation of the Council ICL 1902T computer. Experience of ICL equipment and the George 2 operating system is desirable, but applicants who are otherwise suitably qualified will be considered for training.

If you would like further information ring Brian Perry, 01-369 6565 ext. 2573. If required, interviews can be arranged outside normal office hours.

For an application form please send an a.s.e. to the Borough Treasurer, P.O. Box 64, Civic Centre, Silver Street, Enfield, EN1 2XP. Closing date 23rd June, 1978. Please quote reference ORA/184.

MANAGEMENT & EXECUTIVE SELECTION

telephone 01-637 9611

SYSTEMS ANALYSTS · TECHNICAL SUPPORT SPEC.

Link-up with a Leader

You've often heard the 'Buzz-Word' Distributed Processing, now here's your chance to join a company who will appreciate your present skills and help you develop new ones.

Our client, a major international distributor, is looking for bright intelligent people, who enjoy solving problems, to join their technical support group to work on the installation of one of the first mini-based Networking systems in Europe.

So if you can tick any of the boxes below and would like further information, contact Tony McGrath

- ☐ T.P. experience
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MANAGEMENT &
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Interviews will be
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to suit YOU!!!

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Experienced Sales Person to sell Computer Ancillaries £6,000 on Target; Sales Manager North East £7,500 Basic Leads Based: Software House requires OEM Sales People £10,000.

PROGRAMMER/ANALYSTS

Team Leader, 1900 COBOL
370 COBOL OS/OS
2803/Singer COBOL
1900 TP Experience
BCL Molecular Experience
Honeywell Level 68
370 COBOL/Assembler with or without CICS
Honeywell Level 81/82
1900 COBOL DRIVER/COMMS MGR

Newcastle
Manchester/York/Lancs.
Scotland/Manchester/Midlands
Cheshire/Manchester/N. East
Manchester
Merseyside/Manchester
Manchester
Lancashire Coast
Manchester/Merseyside/N. East

£8000
£8100
£8000
£4900
£4700
£8000
£8000
£8000
£8000

PROGRAMMERS

MKIV Progs
Honeywell COBOL
IBM COBOL/Assembler

Manchester Area
Liverpool/Manchester
Leicester/York/Manchester

NEG
£4500
£3100

SENIOR POSITIONS

Programming Team Leaders 370 COBOL
Systems Programmer 360/370
Support Analysts Minis
Team Leader 1900/POP
PLAN Programmer 5 years' experience
Consultant 2803/2904/System 10
Senior Analyst 370/OS/DO
Operating Systems Consultant 2900
Project Leader (Analyst)
Asst. Recruitment Manager—Software House
Chief Programmer 1900/2900
Consultants Minis

Leicester
Manchester
Manchester/Birmingham
N. East
Manchester
Scotland/B'ham/Mcr
Scotland
Southam Eng./Mcr.
Birmingham
Manchester
South Lancs.
Manchester

£5800
£5800
£5800
£5800
£5800
£7000
£6000
£6000
£6000
£6000
£7000+

SYSTEMS ANALYSTS

370 Engineering Applications
1900 On-Line Applications
IBM Production Control Experience
Honeywell GCOS
370 IMS
Commercial Exp. in Industrial Env.
Burroughs D & M Background
1900 Commercial Applications
System 4 Manufacturing Applications
Training Analyst with COBOL

Manchester/Scotland
Sheffield/Midlands
Leeds
Merseyside/Mcr.
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Manchester
Lancashire
Derbyshire/Mcr.
North West
Stockport

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£4800
£5800
£4700
£6000
£6000
£8100
£8000
£8000

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Systems Design and Programming for Online Systems

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The specialists in online systems are seeking experienced systems designers and programmers at all levels for our

Oxford, West London, Manchester, Dublin, European and Overseas Project Centres

for interesting and challenging opportunities to work on clients' online transaction processing systems.

Chief Programmers

able to lead our own and client programming teams on online projects.

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to take full project responsibility.

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at least three years programming experience.

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at least one year ICL experience programming in either PLAN or COBOL.

Systems Designers

experience in the design and implementation of online systems.

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Software Sales

to market software products and services for Online Systems.

We offer

- Good salaries and conditions
- Bonus scheme
- Pleasant working environment
- Variety of applications
- Outstanding opportunities for personal growth in a growth company
- The chance to travel if you wish

We have our own 2904, and a 2950 on order... we are growing fast. We shall double in size again this year. Telecomputing is now providing advisory, training and implementation services for installing online computer systems around the world.

If you would like the opportunity to get into the area of online systems or you already have online experience on which you wish to build, please write or phone.

Telecomputing Ltd, Sencourt Tower, West Way, Oxford OX2 0ED.
Phone Oxford (0865) 723621 (daytime) or 01 866 9094 (evenings).

MICROSTAR ★★★★★★

Software Programmer

£5,500 CITY

Our client is a major service bureau organisation with an advanced international commitment to IBM compatible systems.

The UK operation offers to a wide range of clients real-time access to well-tuned and efficient systems under MVS. In addition, substantial in-house developments of IBM's popular operating systems are in use.

The advertised position is for a DOS expert with some experience of OS and/or conversion work. Excellent Assembler capability and recent DOS-support experience are prerequisite.

A degree would be an advantage to further career development. Some initial training will occur in Europe in the Client's specialised methods and procedures.

Write, in the first instance, to Robert G. J. Wood, MA, who is advising personally on this appointment at:
Microstar Limited, Hitherbury House
97 Portsmouth Road, Guildford, Surrey GU2 5DL
Telephone Guildford (0483) 33031

★★★★★★★★★ MICROSTAR

MICROSTAR ★★★★★★

Data Processing Manager

£7,500 GUILDFORD

Our client is a leading retail organisation in domestic consumer products, with offices in major cities.

The data processing department is a well balanced development and production unit currently engaged in a major transfer to IMS processing. Its staff are young, enthusiastic and technically competent.

The advertised position reports to a main Board Director and involves considerable liaison with other data processing professionals in Europe and America.

A degree and not less than seven years in data processing are required for this position, which will suit a senior manager particularly good at inter-personal relationships at all levels, who still works in his shirt-sleeves.

Write, in the first instance, to Robert G. J. Wood, MA, who is advising personally on this appointment at:
Microstar Limited, Hitherbury House
97 Portsmouth Road, Guildford, Surrey GU2 5DL
Telephone Guildford (0483) 33031

★★★★★★★★★ MICROSTAR

UNIVERSITY OF LONDON COMPUTER CENTRE

HEAD OF COMMUNICATIONS AND NETWORKING

The University of London Computer Centre provides a regional computer service to the University of London in the South East and South West of England. The Centre is equipped with Control Data 7600, 8600, 9400 and CYBER 72 computers and supports a large communications network of over 50 remote batch terminals and 30 keyboard terminals. The Centre is already deeply involved in computer communications and data networking, and has an extensive installation of remote job entry and terminal facilities. Plans are for the further development and installation of a completely new local communications system. Included in this project will be an involvement in a new packet-switching network.

A senior person is sought to be in charge of the new project. He will have had extensive experience in the field of digital communications and networking, and will be expected to have a modern and wide understanding of both hardware and software. He must have a sound and comprehensive knowledge of industrial products in relevant fields, and must be able to make full use of industry support in the provision of both hardware and software.

Candidates for the post would normally have a position of standing in the area of communications and networking. Duties of the post will involve negotiations concerned with defining new network standards and conventions. A higher degree in a scientific discipline will be considered as an advantage. An appointment will be made either in Grade III (salary range £7074-£8730) or, for an exceptional candidate, in Grade IV (range £8800 upwards), plus £450 per annum London Allowance.

The Centre offers excellent conditions of service and operates the Universities Superannuation Scheme.

Please apply to:

The Secretary, University of London Computer Centre
20 Guilford Street, London WC1N 1DZ
Telephone 01-405 6400, Ext. 238.

Closing date for applications 26th June, 1978

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£49,000 - £53,000
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Two Senior Systems Analysts are responsible for Systems development projects from inception to implementation and for the co-ordination of the work of project teams for major applications and must communicate effectively with staff at all levels in user departments both verbally and in writing. The Systems Programmers undertake the specification and design of Computer Programs and the programming of complex work and also assist in the co-ordination of the programming and associated activities of teams working on the larger systems.

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Communications software or TP applications programming is desirable.

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These posts are permanent, superannuable and subject to the satisfactory completion of a medical questionnaire.

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Our client, a major organisation, situated close to both M4 and M3 motorways is seeking a senior analyst to act as PROJECT LEADER on a wide range of applications. If you have approx. 3 years' systems experience previously in ICL 1900 series environment, and are able to demonstrate a professional approach to project management apply NOW!

- * Co offers
- * Job security with prestige concern
- * Responsibility
- * Excellent working environment
- * Free lunches, free life insurance
- * Salary £8,500 + company car

Ref. 1829

ICL PROGRAMMERS

LONDON
Due to development of their advanced computer systems, successful O.P. Services dept. seeks to boost its programming team. Retaining large ICL 1900 equipment they offer excellent opportunities for persons with min. 2 years' ICL COBOL experience. Co offers:

- * Involvement in development of IDMS Database
- * Development of variety of applications
- * Progression to analysis with secure career path
- * Exc. perks include flexi hours — 3 weeks holiday
- * Salary to £6,500

Ref. 1849

NCR PROGS

LONDON
Our client, an international company covering a large range of NCR mainframes and minis seek COBOL programmers at all levels. They are involved at present in a variety of commercial, financial and industrial projects. Co offer:

- * Training opportunities for IBM, ICL or UNIVAC COBOL progs
- * Extensive training on new machines
- * Career development in systems
- * Excellent co. benefits
- * Salary to £8,000

Ref. 1327

WHY NOT FIND OUT WHAT IS AVAILABLE IN YOUR AREA?

This is only a small selection of posts we have available at present. If however, you don't see anything to suit your requirements please do not hesitate to telephone us. We have a wide choice of jobs at varying levels throughout the U.K.
For the above positions — please telephone 01-734 0152/3010 (24 hours) quoting the respective reference number, or write to our London office

CONTRACT DIVISION



U.K.

ICL 1900 GII COBOL	MIDOX	£150 pw
IBM COBOL PROGRAMMERS	HERTS	£230 pw
ICL 1900 PLAN DRIVER	HERTS	£220 pw
CICS ASSEMBLER	CITY	£250 pw
CICS ASSEMBLER	SURREY	£270 pw
IBM DOS PL/I	EAST MIDLANDS	£200 pw
IBM DPS VS CICS VS PL/I	EAST MIDLANDS	£230 pw
IBM DL/I	MIDLANDS	£225 pw
IBM DOS VS COBOL	LIVERPOOL	£200 pw
OS COBOL	SURREY	£180 pw
OS COBOL	N. LONDON	£180 pw
IBM RPGII	ESSEX	£200 pw

For Midland and N. England requirements phone 061/833 9341/3 (Manchester) or 021-236 1794 ext 223 (Birmingham). For all other contracts phone London Office, Christine Kay or Dave Heyton, 01-734 0152 (24 hrs.)

KNIGHT PROGRAMMING SUPPORT LIMITED

27 NOEL STREET, LONDON W1P 6TE. TELEPHONE 01-734 0152 (24 HOURS)
OFFICES: AMSTERDAM, PARIS, MANCHESTER, BIRMINGHAM

IBM PROGRAMMERS

LONDON
Multi national co retaining large IBM 370 equipment require programmers with min. 12 months' exp to join highly professional team. Currently developing a major sophisticated on-line real-time system the co offers:

- * Major established co with interests in U.K. and overseas
- * Well-planned long term schedule
- * Excellent opportunities for training and future openings for analysis
- * Excellent benefits including generous holiday concessions
- * Salary to £8,000

Ref. 1290

JNR PROGS

LONDON
Challenging careers await persons with approx 12 months' programming exp on any machine, any language, with drive and enthusiasm who want to follow a positive career path. Opportunities as follows:

- * Training in T.P. and Database
- * Development work on new sophisticated systems
- * Career progression with forward thinkers
- * Up to date technology
- * Salary to £4,900

Ref. 1650

HONEYWELL ANALYST PROG

LONDON
Manufacturing company producing a wide range of household goods is seeking an analyst programmer with at least 2 years' COBOL experience. The successful applicant will join a professional and enthusiastic team utilising Honeywell Mainframe and preferably had GCOS experience. Co offers:

- * Excellent working environment
- * Good career prospects
- * Life Ass, BUPA, LVA & 4 weeks holiday
- * Discount on all company products
- * Salary to £8,000

Ref. 1493

ANALYST PROGRAMMER

HOLLAND
Our client is a major organisation meeting the ground power needs of world's airlines by engineering a broad range of products to clients in more than 100 nations. Retaining Honeywell 62/40 under GCOS, they seek persons with 2-3 years' COBOL exp.

- * Responsibility as the No 2 to the D.P.M.
- * Lots of user liaison
- * Variety of interesting applications with Honeywell IMS package
- * Excellent fringe benefits
- * Salary OFL 42-49,000 (£12,000)

Ref. 1938

OVERSEAS

IBM PL/I DOS	E. LONDON	£200+ pw
IBM COSOL/RPOII	SURREY	£200+ pw
POP II REAL TIME CONSULTANT	MIDLANDS	£250+ pw
POP II RSTS/E BASIC +	HERTS	£200+ pw
COBOL OL/I	C. LONDON	£220+ pw
CICS COBOL	HOLLAND	£400 pw
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POP II/34 MUMPS DESIGN & PROGRAMMING	HOLLAND	£400+ pw
PL/I DOS KNOWLEDGE OF FRENCH ADV.	PARIS	£300 pw
SEN PROG PLI GOOD FRENCH	PARIS	£400 pw
UNIVAC OMS	HOLLAND	£400 pw

Programmers & Analysts UNRUT YOURSELVES

Stimulation, variety, and ever-growing work environment, new problems to solve, new challenges to meet your ability — that is our offer. Our aggressive, dynamic, and adaptable approach has earned us a sizeable share of the market and we are now poised for further expansion. We consider ourselves the best in the field — and with a strong people are our major asset and when we recruit we have the resources and opportunities to attract the best.

At the moment we need mobile professionals with varying degrees of experience.

PROGRAMMERS

COBOL PROGRAMMERS • BASIC PLUS PROGRAMMERS • IBM ASSEMBLER PROGRAMMERS • PDPII/MACRO II PROGRAMMERS
also PL/I HONEYWELL TDS, IMS/DLI and DB/DC

however, whatever your computer work background, we want to hear from you.

ANALYSTS

Mainframe and Mini experience with particular emphasis on people able to control a team of programmers and manage all aspects of our customer contact.

We need people with imagination and versatility to work on a variety of projects which include turn key systems, conversion and transition, specific customer implementations. In return we offer a chance to develop your career.

your experience, to negotiate your salary and to develop your career in a highly motivated organisation that is growing fast.

Contact us now: Phone Penny Bailey on 01-402 9355 (24 hours). Find out more about our current plans and if you are impressed we will arrange a convenient interview for you. Marcol Computer Services, Limited, 10 Queens Gardens, London W2.



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Systems Development in Hampshire

Salary Negotiable + Fringe Benefits

Our earlier advertisements attracted some key people to join our projects in Hampshire but we have additional opportunities for the right people now.

We are a life insurance and unit trust Company and we are growing fast — we need sophisticated systems to support our continued expansion. We are committed to developing an integrated insurance system to replace all existing systems using modern technology such as database, real-time on-line facilities via VDU etc. on our new Brintechs 83800 system.

We can offer a stimulating career and first-class rewards for those who can help us in our ambitious plans. We have opportunities now in software development, systems analysis and in application programming. We are looking in particular for experience in the following fields —

- Real-time applications
- Database technology
- Bought-in Medium systems

We would like to hear from you. Those of you who join us will enjoy a comprehensive package including competitive salary, plus mortgage subsidy facilities, non-contributory pension, life insurance and permanent health schemes. Generous relocation expenses will be available for those who move to join us.

Telephone Answer 62188 Ext. 207 or write now for an application form to:

TSB Trust Company Limited, White Bear House, 21 Chantry Way, Andover, Hants, SP10 1PD.

TSB



Anglian Water Authority

CORPORATE PLANNING

To £5,000 (NJC Grade 6)
* Plus New Award from July 1978 *

Do you understand computers?
Can you analyse situations and make computers work for you?
Can you help us to analyse the effects and benefits of our Capital Development Programmes?

The Anglian Water Authority invest £300M every 5 years on the water services in an area covering one-fifth of England. The investment data base is currently held on a DEC POP10 but will shortly be transferred to the Authority's own Honeywell 68/10.

If you have a flair for problem solving and want to join a small professional team of Corporate Planners, contact us but only if you can pull your weight.

We are looking for one good Programmer with at least 3 years at the senior level who wants to broaden his/her scope. Previous experience of Corporate Planning is not necessary — but you should understand computers and how to make them do the work. Programming experience in FORTRAN is an advantage as would experience with Honeywell 68/10 on a DEC POP 10 machine, but we are prepared to train a person with the right attitude and proven ability.

If you are interested or want to know more about this opportunity, why not call Peter Cowie, Huntingdon (0440) 58181 Ext. 283 for information and an application form.

The closing date for applications is 22nd June, 1978 and should be sent to:

ANGLIAN WATER AUTHORITY
Diploma House, Grammar School Walk
Huntingdon, Cambs. PE16 6NL.

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dp

COMPUTER OFFICER

£5 044 58 £5,350 £6 plus casual
use car allowance £501

Hatfield's Comprehensive Housing Services is looking for a person who has computer systems development experience and who would now like to put this experience to use in an effort to improve the operational efficiency and information systems of the Housing Service in the interests of the public.

An enthusiastic, self-motivated person is therefore required who can ensure that the Housing Service's computer systems are fully developed and utilised. This is a new post which is based within the Housing Service to ensure that the Housing Service's computer systems are fully developed and utilised. The post holder will be required to liaise closely with an existing Housing Service team, whose main role is to develop the use of a job consortium, on-line, computer systems L.O.A., which uses an IBM 370/158. The successful applicant could work on any Housing Service function which requires computer system support (e.g. property records, rates, welfare etc.) and should have the ability to liaise closely with other officers to understand and identify areas where computer developments are needed.

Application form and job description can be obtained from: Chief Administrative Officer, 13/17 Station Road, Wood Green, N.22. Applications returnable by 21st June, 1978.

COMPUTER PROGRAMMER

London up to £3900

British Gas are looking for an experienced Programmer to work in their Exploration department based at Marble Arch.

The job involves writing, without supervision, computer programs in FORTRAN for the Engineers of the Petroleum Engineering Section. Knowledge of Univas 1100 'Exec 8' job control language would be an advantage but is not essential. You should have 'A' levels in Science and Maths and experience in programming for scientific applications.

Salary range £3200-£3800.

Please write with full details of age, experience, qualifications and current salary, quoting reference PS/724701 (745), to the Senior Personnel Officer (London), British Gas, 59 Brynston Street, London W1A 2AZ. Closing date for applications 28th June, 1978.

BRITISH GAS

Fortran Programmer

Up to £5,000

Our client, a major Civil Engineering Contractor is looking for an experienced engineering/scientific computer programmer to join an established team concerned with writing, developing and maintaining computer programs for a variety of Municipal Engineering applications.

The computer facilities are situated in modern office accommodation in West London and include in-house mini-computers with plotting and graphics display peripherals.

You should have a minimum of 2 years' experience in writing FORTRAN programs, preferably using mini-computers, together with the ability to work efficiently with a minimum of supervision.

In addition to a salary in the region of £5,000 p.a., the substantial range of benefits usually associated with a large successful organisation are offered. Please write with details of your career to date to: N.S. Holker, at the address below, quoting ref. FP/260 CM. Lst on a separate sheet. Companies to which your reply should not be forwarded. All replies will be answered.

B&B

CONFIDENTIAL REPLY SERVICE
Benton & Bowles Recruitment Limited,
197 Knightsbridge, London SW7

Rural Staffordshire CHIEF PROGRAMMER

Salary up to £6,750

This is a unique opportunity to join a D.P. Department within a dynamic manufacturing concern. The present installation is COBOL based on a medium scale processor, employing VDUs and intelligent terminals and this is to be replaced by new generation hardware in the immediate future.

Candidates should have at least two of the following:

- ★ four or more years' programming experience
- ★ fluency in COBOL
- ★ real-time experience
- ★ sound technical knowledge
- ★ a positive approach and desire to contribute to a professional data processing department

The company offers superb working conditions and generous relocation assistance in an area of low-cost housing.

Interested candidates who have a genuine desire to accept the challenge of this thoroughly stimulating position should in the first instance:

CONTACT RICHARD CHAMPION ON 021-236 3781

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Freeport, Blackfriars House, The Personage, Manchester M3 8BB
LONDON 01-935 0671
Freeport 4, 102, Blomfield Street,
London W1E 1JZ

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Analyst/Programmers for Management Consultancy to £5,500

Due to continued growth we have opportunities for analyst/programmers of high potential to join the UK division of our international management consultancy practice. Vacancies exist in our London, Birmingham, Manchester and Newcastle offices.

The work of our analyst/programmer group includes developing effective DP systems, supporting and implementing software packages, providing technical assistance in the use of audit interrogation packages and assisting experienced consultants on a wide variety of DP assignments. The work takes place in the UK and overseas and is challenging and demanding as clients expect and receive a service of the highest quality, working to tight time and cost budgets.

We would like to meet young analysts and programmers with current knowledge of a major supplier's hardware and software in a commercial environment where seeking to broaden their experience and careers. Work on mini-computers with a high level language would be an advantage. All important are intelligence, ambition and enthusiasm. In addition we will consider applications from bright, numerate graduates without DP experience. Formal and on-the-job training in DP and management will be provided.

Starting salaries will be negotiated up to £5,500 with substantial allowances for overseas work. Career opportunities are excellent and can lead to salaries in excess of £12,000.

If you would like an informal talk please call (reversing charges if long distance) Patrick Kiernan or Jim Keenan on 01-407 8989 or write to either at Southwark Towers, 32 London Bridge Street, SE1 8SY, asking for an application form and quoting MCS/3692.

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HEAD OF EDUCATIONAL PLANNING & EVALUATION

Computers

Tehran

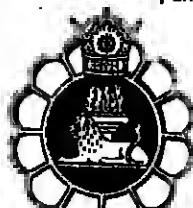
There is a vacancy for the above post at the Computer Training Division of the National Iranian Oil Company in Tehran.

The person appointed will assume responsibility for courses and training programmes in conjunction with the Training Department. This will include the design of curricula in areas of data processing using systems analysis to determine training requirements for the company and users.

The successful applicant will also be required to develop appraisal techniques for members of staff and update the Department on educational technology.

Proven ability in a similar position with teaching experience at an advanced level in data processing is necessary, together with a degree and/or postgraduate qualification in Computer Sciences or a related field.

An excellent salary and benefits package are offered. Please apply as soon as possible to



Mr. A. Etamadi
Head of Administration
National Iranian Oil Company
Granville House
132/133 Staines Street
London, E.W.1

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of BOC Datacentre Group and a member of
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Senior Analyst Programmer Analyst Programmer

Our client situated in Lancashire, is one of the U.K.'s foremost engineering groups with its products being sold and recognised on a world-wide basis.

In addition to major new developments being introduced in many business activities, the Payroll System is to be replaced by the implementation of the UNIPAY package.

As a result of this development vacancies have arisen for a SENIOR ANALYST PROGRAMMER and an ANALYST PROGRAMMER to assist in the implementation of UNIPAY.

Applicants should have current experience of UNIPAY. Familiarity with IBM Assembler is essential.

Our clients policy is one of continual improvement resulting in many opportunities to join development or enhancement projects. Successful male or female applicants can expect to earn an excellent salary plus productivity bonus and many unique fringe benefits including generous relocation assistance where applicable.

Applicants should write giving full but concise details of age, qualifications, career history and salary to date stating the names of any organisations to which their application may not be sent to: R.D. Taylor, Regional Manager.

Whites

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datascene

OPERATORS & DATA CONTROL

ICL	GB	SNR RP	18mths+	N. LONDON	£2600	ICL 1900 GII SHIFT LDR	£4200
ICL	GB	OPERATOR	1yr	W. LONDON	£2600	Minimum 2 years' exp. required for this N.E. London installation. 2 shifts only. Perks include free meals.	
ICL	GB	SNR RP	2yrs	C. LONDON	£4000		
ICL	GB	SNR RP	18mths	E. LONDON	£4300	IBM 370 DS SENIOR OP	£4600
IBM	DO	OPERATOR	1yr	MIDOX	£3600	Central London based financial installation requires OS OPS with 2 years' exp. and some JCL knowledge. Excellent career prospects.	
IBM	DO	OPERATOR	1yr+	D. LONDON	£3800	IBM 370 DOS SNR & JNR OPS	£4400
IBM	DO	OPERATOR	1yr+	C. LONDON	£4000	1-2 years' exp. required for installation based in E. London. Excellent salary and perks including subsidised mortgages, loans and meals.	
IBM	DO	OPERATOR	1yr+	CROYDON	£3750	PDP 11 OPERATOR	£4000
IBM	DO	SNR RP	18mths	SUSSEX	£4000	18 months' exp. required for a Merchant Bank in the City. Good career prospects and perks include Mortgage subsidy.	
IBM	DO	SUP/DAYS	18mths	W. LONDON	£4200	NCR B1-B2 OPERATOR/SENIOR OP	£4000+
IBM	DO	JUN OP	18mths	ESSEX	£3600	A minimum of 2 years' exp. required for this N. London site. 3 shifts and latest NCR hardware.	
IBM	DO	OPERATOR	1yr	SURREY	£3750	PRODUCTION ASSISTANT IBM OS/VS1	£4000
IBM	DO	OPERATOR	18mths	CITY	£3800	2 years + exp. In data control, plus a good working knowledge of JCL. Good career prospects plus Season Ticket Loans and free BUPA.	
IBM	DO	OPERATOR	18mths	C. LONDON	£4200		
IBM	DO	OPERATOR	1yr+	C. LONDON	£3600		

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You will be my client's source of understanding on all aspects of synchronous transmission protocols and methods. The post covers assessment of a whole range of terminals (hardware and software) and liaison with different manufacturers.

To be successful in this role demands 'A'/HND level qualifications and approximately 5 years in computing, including some sound teleprocessing experience.

Contact DAVID J. HUTCHINSON for further information.

RW 22/1

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SHIFT LEADERS to £4,250

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If you are young, competent and ambitious enough to see yourself moving upwards into operations management within 2 years then please apply. As a senior man in a small team you will liaise with customers. Aged around 23/25, preferably with 'A' levels, you should have c 3 years' ops. experience including on-line. Full training, including programming, will be given.

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RW 22/3

AT LAST SOMETHING NEW for ANALYST/PROGRAMMERS

CITY to £6,500 p.a.

Are you fed up with hacking out those same old boring systems? Is your only real career progression a larger salary? YES — then read on.

My client can offer a constant stream of unusual and interesting applications and the opportunity to enhance your technical expertise and enjoy more responsibility and user contact. They are one of the industry's leading technical corporations and develop systems over a wide spectrum of business. All systems are developed in a high level language interactively, on-line and are implemented on a database network that literally spans the world.

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RW 22/2

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You need customer acceptability, programming experience and preferably some exposure to database. Your practical experience may have been gained in Management Services, Operational Research or Corporate Planning functions within Finance, Banking, Insurance, Manufacturing, Retailing, etc., it matters not. What does matter is personality and the desire to enhance your own commercial business skills. Your future career development is then up to you.

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RW 22/4

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Consultant: John Wood

ANALYSTS & PROGRAMMERS BIRMINGHAM

TO £5500

The EMS Data Centre at Fosseway, Edgbaston, is currently expanding the Turnkey Systems Division to cope with substantial applications and package development across all business areas. Subsequently, we need experienced, motivated staff able to work to agreed schedules and switch from one applications project to another as directed by Management. Analysts should hold a current driving licence to enable them to make regular visits to U.K. clients in order to discuss individual requirements. Programmers must have COBOL knowledge. Full attention and thoroughness in writing will be applied. EMS at our Data Centre for suitable candidates.

Consultants: Dennis Filby/Damien Hendall

1,000 COBOL/ASSEMBLER PROGRAMMERS U.K.

£3500-£6000

EMS currently has over 1,000 vacancies all of an urgent nature throughout the U.K. including a large quantity within London and the Home Counties, West Country, West Midlands, North-West, Yorkshire and Scotland. A vast choice exists to all applicants irrespective of location. Vacancies are being notified to EMS at the rate of 200-300 each week. Why miss out on this vast market selection for yourselves. Join thousands of other satisfied EMS users - let the professionals get early results for you. It doesn't cost you anything. With six months' experience upwards, complete the attached application form today.

Consultant: Selina Mills/Carol Proudman

IBM ASSEMBLER PROGRAMMERS LONDON, NW1

TO £5000

A major IBM user, with extensive on-line and real-time networking has urgent requirements for numerous additional programmers to work on the current multi-user system and to assist with ongoing development work. Many fringe benefits exist for experienced ASSEMBLER Programmers including low cost international holidays, etc. Equally, early career progression is possible for motivated programmers. Don't delay, complete our application form today and we will have you in interviews within five days with lucrative offers to follow.

Consultant: Don Philp

IMS DESIGNERS AND PROGRAMMERS TO £8000

We currently have large quantities of vacancies throughout London, Home Counties, Midlands and Northern Counties for staff with previous IMS installations, either in industrial or commercial environments. Excellent employment opportunities exist with a large data bank of EMS clients throughout the U.K. Unparalleled experience with IMS or DL/I experience, simply complete the attached application form and let EMS rapidly get interviews arranged and early results for you.

Consultant: Neil Bradley

EMS CONSULTING CAREERS

The Group has a range of career development opportunities second to none in the U.K. covering all ranges of employment from front end consultancy in back end packages development. Facilities Management and Applications Development in our regional Data Centres.

EMS Consultants are currently working throughout the entire U.K. assisting such clients as Government Agencies, Electrical Manufacturers, Bureaux, Distributors, Chain Store Groups, Engineers and Mini-Computer Stand Alone or Network Users.

EMS in addition have the only large Data Centre Development unit in the country, based in Birmingham and accommodating up to 150 people. Futuristic training and demonstration facilities have been incorporated within this unit. All work station desks have their own terminals incorporated for program development where appropriate. Extensive package design and development is already in progress to support our Honeywell Level 6 Turnkey Systems sales. We offer wide diverse applications involvement, in all trading areas with the opportunity of UK or international travel, if required. Conversion training to Honeywell hardware will be supplied for otherwise acceptable candidates. Without doubt, EMS will be the place to be during the 1980s. Join now and secure a Managerial position only with a rapidly growing market leader.

ANALYSTS & PROGRAMMERS LIVERPOOL

TO £6500

A major distribution organisation have expanding requirements for more experienced staff to work on a wide variety of commercial projects. Some projects clearly being developed include stock control, ordering, depot stores accounting and payroll. Many systems are also being developed within the group. Our client has a well developed environment offering scope to work for one of the largest installations in Europe. Complete the attached form for a free interview.

Contact: Denis Filby

ANALYSTS - STAFFORDSHIRE

TO £6000

A large purchasing group of national repute, has 10 systems vacant for Analysts with a minimum one year's experience. The group has a wide range of advanced, sophisticated management information systems currently operating and plan further development within the area. A knowledge of PL/I or BAL would be useful although not essential.

Excellent management approval and training schemes exist within the group offering candidates the opportunity of gaining diverse and valuable management services training. In addition to attractive salaries, various fringe benefits are available and adequate relocation assistance. Housing available within the region is adequate and reasonably priced. Again, the countryside is within easy reach of the company and a large shopping centre is available for housewives. The Group in question is a leading national employer with sound industrial relations and a progressive OP expansion plan during the coming year. Please complete our application form without delay for early interview.

Consultant: Don Walklate/Anne Lennell

PL/I PROGRAMMERS SOUTH & MIDLANDS

TO £6500

EMS currently have a wide range of PL/I vacancies both for users and consultants throughout the United Kingdom. Most vacancies involve development projects for major users, often with industrial involvement. Clients include bureaux, distributors, engineers, manufacturers, etc. A wide choice exists for all applicants, just complete the attached form today and let EMS get rapid results for you.

Contact: Neil Bradley

EMS Consultants Ltd.
61-63 Lower Street
Newcastle-under-Lyme
Staffs ST5 2RS
Telephone 0782 823665
(10 lines)
Register No. 001

NOTTINGHAMSHIRE IBM PROGRAMMERS

TO £4500

A large distribution based organisation requires experienced IBM Programmers with from one year's experience upwards of COBOL. Programmers currently resident within Nottingham would be especially welcome. Our clients offer the opportunity of working on a wide variety of distribution based applications with possibilities of future career development in specialised programming or with the option of a move towards systems. Applicants must be situated to at least HND or degree level.

Consultant: John Wood

TIMESHARING SALESMEN MIDLANDS & NORTH

TO £8000

EMS are currently planning the launch of a major time sharing service throughout the North and Midlands based on ICL and Honeywell hardware. Both packages and custom-built system facilities will be available. Primary clients will purchase or lease their own printers, videos and concentrators from EMS, therefore, having total control of their own data preparation. Both on-line and batch facilities are currently available with adequate staff back-up facilities within the EMS Group to handle virtually any range of customer requirements. All candidates must have a proven track record in the timesharing field and be capable of negotiating SK to SK contracts. Opportunities exist also to market in addition, Consultancy Services, Turnkey Systems and Recruitment Services to optimise earnings.

Consultant: John Wood or Niall Bradley

IBM PROGRAMMERS & OPERATORS WEST MIDLANDS

NEGOTIABLE

Our clients, a large engineering group's centralised group computer bureau need additional staff to assist with both development projects and maintaining current systems. Experience of RPG 2 or ASSEMBLER is required preferably having spent at least six months on 370 hardware.

Consultant: Carol Proudman

PROGRAMMERS TO ANALYSTS LONDON BANKS

£5000-£9000

Our client, a leading international bank, is engaged successfully in numerous international funding projects. Senior Database/Teleprocessing Analysts with a minimum of three years' experience are required. Equally, a background involvement at some point is necessary in CIBOL. This client is prepared to pay a £8000.

Senior Analysts with personal experience of funding jobs through from feasibility studies to implementation with a COBOL programming background and applications experience in an on-line banking or insurance environment are preferred but not essential. Senior Analysts must show the aptitude for team leadership. For those appointments, the client will pay circa £8250.

Senior Programmers with at least three years' COBOL programming and the ability to design complex suites of programs are required. Previous experience of systems design and on-line/real time processing will be an advantage. Good communication skills will be required with aptitude to develop your managerial skills. A package in the region of £7250 will be offered.

Programmers with at least 18 months RPG II experience, preferably on IBM System 32 or similar hardware are required. The candidate will be involved in program design, coding, implementation and the preparation of documentation. A salary package of c £6250 will be offered.

These and numerous other vacancies will be offered, and must be the best banking vacancies in London today. Take this opportunity of winning one for yourself through EMS. Complete our enclosed application form today. Interviews next week and offers the week after. That's EMS for you.

Consultant: Don Philp

SYSTEMS MANAGER IBM SYS.3 NORTH LONDON

TO £6500

Main responsibilities will include carrying out feasibility studies, evaluating the cost/benefit of system proposals and preparing systems specs for handing over to Programmers. Equally, duties will include systems testing, implementation and supervision with one, and later, probably two programmers. Programming experience of RPG2 would be advantageous, as would 3 years' systems analysis experience and design involvement. Teleprocessing experience in a commercial environment is sought.

Consultant: Carol Proudman/Don Philp

ANALYST/PROGRAMMERS SURREY

TO £7000

Applicants should be graduates or equivalent, capable of working on data and telecommunications using ASSEMBLER or Real Time commercial applications. The clients are a Business Systems Manufacturer. Relocation assistance is available.

Consultant: Don Philp

DOS COBOL PROGRAMMERS KUWAIT

£8500 + +

One of Kuwait's largest and most advanced banking DP units has urgent requirements for additional Programmers with commercial or bank banking involvement. Ability to use CICS would be particularly advantageous. Applicants should preferably be single or married with no children. Our clients require qualifications to minimum HND standard. Assistance will be provided for relocation and additional accommodation allowances. London and Midlands interviewees will be held during the next two weeks with early decisions. Please complete the attached application form as soon as possible.

Consultant: John Wood

ANALYSTS/PROGRAMMERS COBOL BIRMINGHAM

TO £5000

Two vacancies currently exist for COBOL Analyst/Programmers to join a large engineering group with a new Honeywell installation. Considerable development projects are in hand including Logistics, Sales Order Processing, Sales and Purchase Analysis, Payroll, Production and Stock Control, etc. Candidates should have at least 2 years' systems and programming experience in an engineering environment and be capable of taking on project control and development responsibility.

Consultant: Denis Filby

APPLICATIONS & PACKAGE DEVELOPMENT BIRMINGHAM

TO £5500 +

EMS urgently require experienced Analysts and Programmers to assist with both sophisticated on-line package development and custom-built systems working to agreed time scales. Subsequently, we need experienced staff with a sound commercial or industrial background, able to develop applications systems in Stock Control, Production Control, Sales Order Processing, Accounting Ledger Systems, etc. Equally, we need senior staff capable of assisting with the training of user staff on occasions and project leading custom-built systems. Teams will handle up to four different Turnkey Systems each at any moment in time, assuring substantial job interest.

Consultant: Dennis Filby

COBOL PROGRAMMERS LONDON & HOME COUNTIES

£4000-£5500

We currently have hundreds of vacancies on all ranges of hardware for COBOL Programmers in the London and Southern areas. Clients include Banks, Bureaux, Computer Manufacturers, Consultants, Distributors, Engineers, etc. EMS can produce up to 20 interviews for you within five to ten days of original application. Many candidates are in fact offered both interviews and jobs within five days of application. We offer an unrivalled quantity of vacancies elsewhere within the consultancy business. Whatever job you are seeking next, EMS can obtain it for you. We are in weekly touch with all computer installations. EMS get results for you and attractive salary increases. Complete our application form today and let us get a selection of new jobs for you within the next few days.

Consultant: Don Philp/Carol Proudman

IMS DESIGNERS AND PROGRAMMERS

TO £8000

We currently have large quantities of vacancies throughout London, Home Counties, Midlands and Northern Counties for any staff with previous IMS involvement, either on industrial or commercial installations. Excellent employment opportunities exist with a large team bank of EMS clients throughout the U.K. unparalleled experience. With IMS or DL/I experience, simply complete this attached application form and let EMS rapidly get interviews arranged and early results for you.

Consultant: Neil Bradley

ANALYSTS & PROGRAMMERS SURREY

NEGOTIABLE

Presence will be for ICL experience in a commercial or financial environment using COBOL. Our clients are a large insurance group operating in the North Surrey area. Candidates should preferably have a minimum of 2 years' systems or programming experience. Consultant: Selina Mills

ANALYSTS/PROGRAMMERS STOKE ON TRENT

c £5000

Analysts will be capable of providing systems investigations, recommendations and specifications in concise report format and standards. Equally, although functioning as an Analyst, you should be capable of assisting with programming - RPG or FORTRAN. Applicants should be equally capable of functioning in a Business Analyst role.

Programmers should be experienced in a Production Systems environment, be a tidy and accurate worker and accept occasional odd working hours to cope with varying priorities. Interviewing and selection employment is available for all candidates.

Consultant: Don Philp

APPLICATIONS SUPPORT BERKS & STAFFS

TO £8000

Two categories of staff are required: one capable of team leadership in Applications Software controlling up to 10 Senior diagnosticists and a second category of large volumes of systems software development staff concerned with architecture, particularly in the compiler field. Numerous vacancies exist in this particular area, again offering attractive rewards to suitably experienced personnel. Working knowledge in the following areas is required: COBOL, FORTRAN, ALGOL, IMS and Applications Packages. We urgently need manufacturing support staff at both the Berkshire and North Staffs locations.

Consultant: Don Walklate/Anne Lennell

CONSULTING PROJECT MANAGERS VARIOUS U.K.

TO £8000 P.A.

We are seeking experienced senior consultants with a minimum of 1 year's DP experience capable of taking control of site project teams throughout the U.K. All applicants must have acquired some degree of managerial control during the last two years and be capable of directing, guiding and motivating up to 50 consulting support staff. A sound knowledge of business information systems will be required, including areas such as Database, TP, Networking, Point of Sale, Data Capture and MIS.

Mobility will be an important factor, as will the ability to work often long, rigorous hours with a minimum of head office involvement. Primarily, the task will be to co-ordinate, schedule, monitor and control client contracts to optimise customer satisfaction whilst at the same time accepting a working systems consultancy role with personal project responsibility.

Each candidate will be judged on merit and communication ability. Apply in the first instance, with the attached application form to Dennis Filby, Resources Manager.

HONEYWELL TDS/IOS COBOL U.K.

TO £7000 +

EMS urgently require large additional quantities of staff to assist major consulting contracts throughout the United Kingdom, working with bureaux, distributors, engineers, freight groups, councils and Government agencies. A wide range of vacancies are available within EMS for client support. Equally, opportunities exist for any experienced Honeywell staff interested in working on software projects incorporating client systems, new packages, off-site custom-built systems at our new national data centres and post-marketing support. EMS offer the best career prospects of Honeywell experienced staff throughout the United Kingdom and have sophisticated training centres for staff training. For a top career move, complete the attached profile form today so that early interviews can be arranged.

Contact: Denis Filby

KUWAIT ANALYSTS & PROGRAMMERS COBOL/ASSEMBLER

TO £13000 p.a. + ACCOM.

We now have a large number of new vacancies throughout Kuwait with clients including Banks, Oil Companies, Car Distributors, Consultants, Bureaux. EMS have just completed a further business tour of the country, visiting every installation to ascertain new requirements. Developments include MIS, IMS, On-line systems and general applications in distributors and stockholders. Hardware tends primarily to be IBM and NCR with a rapid development in the NCR base during the last 12 months. All candidates considering the Middle East should contact us immediately for discussions and forward the attached application form without delay. Interviews will be held during the coming week.

HONEYWELL ANALYSTS & PROGRAMMERS NUMEROUS U.K.

TO £7000

The EMS group have over 120 vacancies throughout the U.K. for experienced Honeywell staff to assist with both applications development for new or upgrading installations and to work on package development for the level 6. A wide variety of installations are available incorporating Engineers, Bureaux, Distributors, Chain Stores, Textile Groups and Local Authorities. EMS offer consulting benefits including attractive travelling allowances, varied career interest and excellent opportunities for early security. Equally, EMS are currently at the forefront of the Level 6 Turnkey Systems field with a large futuristically designed Birmingham Data Centre and new centres planned for Leeds and London. We view these vacancies as the most attractive employment opportunities for current experienced Honeywell staff.

Consultant: Denis Filby

0782 823665

SENIOR SYSTEMS ANALYSTS STAFFORD

c £5500

SYSTEMS DESIGNER

NEWCASTLE-UPON-TYNE £3750-£5000

A large processing organisation have additional requirements for candidates with a general commercial background, preferably in areas such as Accounting and Sales. Duties to work on a range of development projects incorporating numerous new product ranges. The installation is based on IBM equipment. Some relocation assistance will be provided where appropriate. Consultant: Don Philp

SYSTEMS CO-ORDINATOR

LONDON £7000-£8000

All candidates should have sound experience in design and development through to final installation of general batch systems. A good working knowledge of data base in addition would certainly be an asset. Equally, candidates should be interested in experience or at least sound knowledge of real time techniques. Applicants should be capable of co-ordinating team work in a multi project development role. The Group is a major international industrial concern with adequate scope for future development. Consultant: Don Philp

ANALYSTS & PROGRAMMERS

LEEDS & NEWCASTLE-UPON-TYNE

c £6000+

A major computer manufacturer has a wide range of additional vacancies for candidates with real experience to support installations throughout the whole of the Northern region. All applicants should preferably have at least one year's COBOL experience. Any experience of working in a retail environment would certainly be advantageous although not essential. The career opportunities would be potential for a long time to be matched in any other vacancies within the region at present. Consultant: Denis Filby

2 ANALYST/PROGRAMMERS-COBOL

BUCKS. & EUROPE 6-7K plus

An international group using IBM mainframes are providing a group advisory and support service to European subsidiaries in France, Italy and the U.K. COBOL programming background. The jobs require a fair amount of travel to various European and U.S. locations with all costs reimbursed by the corporation. Complete the application form today and interviews will be arranged where appropriate within the next 3-4 days. Consultant: Don Philp

COBOL ANALYST/PROGRAMMER

BIRMINGHAM c £5000

Our clients, a large engineering group with a Honeywell Level 62 machine, need a Senior Analyst/Programmer able to work with a Consulting Team taking a leading role in both developing new systems and enhancing current systems. A wide range of projects will be available. Candidates must be people able to work without supervision and capable of working to a professional standard. Consultant: Denis Filby

COBOL PROGRAMMER

WATFORD c £5500

Senior Programmers are required by a large Southern Bureau to work in both a development and maintenance capacity. All candidates must have sound COBOL experience and ideally have some FILETAG knowledge. A wide variety of project development work is involved, including work on packages, pre- and post-processor support and individual applications development for specific bureau clients. Consultant: Don Philp

ANALYST/PROGRAMMERS

LONDON, WC1 c £5000

A major UK software consultancy has a number of additional vacancies for candidates with a minimum 12 months' experience preferably IBM system 3 using RPGII. Applications experience should include areas such as invoicing, ledger systems, order processing and coding, debugging, writing to modular programming specifications. Excellent career opportunities exist for early development towards Senior Project Leader capacity. Consultant: Don Philp

SOFTWARE ENGINEERS/PROGRAMMERS

WEST SUSSEX £4500+

Applicants must have a minimum 12 months' scientific programming will be given to many real-time experiences on any range of machines. All successful employees will work on engineering simulation projects and will take on responsibility for programming design functions within a relatively short period of joining the company. Sound career opportunities are available for the successful candidates. Consultant: Don Walklate

PROJECT LEADER

TYNE & WEAR TO £5500

Our client is a major industrial manufacturing company. They require Senior Level candidates to work on an IBM System 3 ideally with a programming background. You should have in-depth systems experience within a manufacturing environment. Any previous involvement in online materials planning would be advantageous. Please complete the application form today for early interviews. Consultant: Don Philp

SCIENTIFIC AND TECHNICAL

PROGRAMMERS SURREY TO £5500

A major engineering group has a wide range of outstanding vacancies at present and urgently need Programmers with experience of any of the following languages: FORTRAN, ALGOL, COBOL, BASIC, PASCAL, APL, etc. A wide variety of development projects are currently involved and early interviews will be given to all candidates with relevant experience applying for these vacancies. Consultant: Don Walklate

SENIOR SYSTEMS ANALYST

NORTH WEST COAST TO £5250

Outlets will incorporate enhancement of existing systems, development of new systems in an on-line accounting and stock control system, design of a large quantity of retail order stores. The successful candidate will work in a large team environment and ideally will be someone with stock control or distribution experience. All candidates must have a programming background with preferably some COBOL knowledge. Consultant: Don Walklate

OPERATIONS MANAGER

NORTH WEST COAST TO £6000 PLUS RELOCATION

Our clients, a large insurance group, are looking for a number of additional Systems Analysts with sound commercial experience and at least three years' COBOL at various points in their career. Ideally, candidates will have some kind of financial or insurance experience. Preference will be for candidates aged 25-35. Excellent fringe benefits exist in addition to attractive salaries with flexi-time also available. Please apply urgently for an early interview. Consultant: Selma Mills

ANALYST/PROGRAMMER

WIRRAL TO £5000

A large industrial group has a number of additional vacancies for candidates ideally with PDP experience but they will accept alternatively ASSEMBLER or even COBOL experience on some occasions. Candidates who work in a small team environment on Accounting, On-line Order Processing, Stock/Production Control Systems with 2-3 years' experience we envisage to be successful for appropriate applications. Good relocation assistance will be provided where appropriate. Consultant: Selma Mills

SYSTEMS ANALYSTS

PORTSMOUTH £5250

Our clients, a large insurance group, are looking for a number of additional Systems Analysts with sound commercial experience and at least three years' COBOL at various points in their career. Ideally, candidates will have some kind of financial or insurance experience. Preference will be for candidates aged 25-35. Excellent fringe benefits exist in addition to attractive salaries with flexi-time also available. Please apply urgently for an early interview. Consultant: Selma Mills

SYSTEMS ANALYSTS & PROJECT MANAGERS

NORTH WEST TO £6500

A large retail and distribution organisation have a current outstanding for approximately 20 further staff due to substantial commitments to further development projects. A wide variety of project development work is currently in hand with the likelihood of further development commitments continuing for the next 3-5 years. We are seeking candidates with a minimum 2 years' commercial experience either residential or in the North West or willing to relocate to the North West. Excellent career opportunities exist. Consultant: Denis Filby or Damien Handlip

ANALYSTS, PROGRAMMERS

BIRMINGHAM c £5000 + CAR

A major manufacturer is currently looking for experienced Analysts with good COBOL programming knowledge. We envisage candidates assisting with the implementation of new computer based systems. The successful candidates will be given a variety of projects to work on. Excellent career opportunities exist for relatively experienced personnel. Consultant: John Wood



EMS CONSULTANTS LTD
61 LDWERS STREET
NEWCASTLE UNDER LYME
STAFFORDSHIRE, ST5 2NS
Tel: 0623 623665

Management Services & Computing Division
Telephone: 0782 623665/6/7/8
Employment Agency & Employment
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COMPUTER WEEKLY, June 8, 1978

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SURNAME Other Names		Telephone	
Address		Home	
Post Code		Brix	
Age	Date of Birth	Place of Birth	Nationality
Married	Children	Car Owner	Height
Position Required		Weight	
Present Position		Required Salary Range	
WHILE DO YOU WANT TO WORK			
Within U.K.	Yes/No	Abroad	Yes/No
Will you move	Yes/No	Europe	Yes/No
Middle East			
NUMBER OF YEARS EXPERIENCE			
Operating	Programming	Systems Design	Systems Analysis
Management	Total		
Available for Interviews			
Available for Employment			
DETAILS OF SECONDARY AND FURTHER EDUCATION			
Schools	Date	Examinations Passed	
College/University	Date	Examinations Passed	
Business Courses with Dates			

Reason for Seeking Change			
Details of type of position wanted			
Additional Information - Please explain below, in an 8-10 line space, your current duties and applications experience			
FOREIGN LANGUAGES			
Spoken	Written	Read	
Please show the number of years experience of the following. Where your experience is not specified please use the blank spaces.			
HARDWARE	OPERATING SYSTEM	LANGUAGES	PACKAGES/SOFTWARE
IBM 360/370	DOS	COBOL	FILETAB
ICL 1900	OS	FORTRAN	DRIVER
ICL 2960/2970	MVT/MFT	ASSEMBLER	CICS
ICL 2903	GEORGE 1	PLAN	IMS
UNIVAC 1100	GEORGE 1	PL1	BOMP
UNIVAC other	GEORGE 3	RPG 2	D BOMP
BURROUGHS 700/800	MCP	USERCODE	PERT
BURROUGHS other	Esac 8	AUTOCODE	V SAM
HONEYWELL 66	GCOS	EASYCODER	IDS/TDS
HONEYWELL 6000	OS 2000/200	ALGOL	MICROFILMING
HONEYWELL other	VMEB/VMEK	NEAT	TELEPROCESSING
NCR	J Level	CORAL	DMS
ICL System 4		DL1	
PDP			

1. Present Employer		Town	
Position		Date Joined	
TYPE OF INSTALLATION			
Commercial	Bureau	Insurance	Scientific
Manufacturing	Banking	Education	Engineering
HARDWARE		LANGUAGES	
Software or Packages			
On-Line	Real Time	Time Sharing	
R.J.E.	Tele Processing	Data Base	
APPLICATION AREAS YOU HAVE BEEN INVOLVED IN (Please Tick)			
Cost Accounting	General Ledger	Manpower Planning	Personnel
Budgeting	Credit Control	Stock Control	Payroll
Forecasting	Order Processing	Production Control	O.R.
Corporate Planning	Marketing	Petrochemicals	Radar
Sales Ledger	Distribution	Linear Programming	Statistics
Purchase Ledger	Traffic Analysis	Simulation	
Projects Completed		Responsibilities	
2. Previous Employer		Town	
Position		Date Joined	
TYPE OF INSTALLATION			
Commercial	Bureau	Insurance	Scientific
Manufacturing	Banking	Education	Engineering
HARDWARE		LANGUAGES	
Software or Packages			
On-Line	Real Time	Time Sharing	
R.J.E.	Tele Processing	Data Base	
APPLICATION AREAS YOU HAVE BEEN INVOLVED IN (Please Tick)			
Cost Accounting	General Ledger	Manpower Planning	Personnel
Budgeting	Credit Control	Stock Control	Payroll
Forecasting	Order Processing	Production Control	O.R.
Corporate Planning	Marketing	Petrochemicals	Radar
Sales Ledger	Distribution	Linear Programming	Statistics
Purchase Ledger	Traffic Analysis	Simulation	
Projects Completed		Responsibilities	

3. Past Employer		Town	
Position		Date Joined	
TYPE OF INSTALLATION			
Commercial	Bureau	Insurance	Scientific
Manufacturing	Banking	Education	Engineering
HARDWARE		LANGUAGES	
Software or Packages			
On-Line	Real Time	Time Sharing	
R.J.E.	Tele Processing	Data Base	
APPLICATION AREAS YOU HAVE BEEN INVOLVED IN (Please Tick)			
Cost Accounting	General Ledger	Manpower Planning	Personnel
Budgeting	Credit Control	Stock Control	Payroll
Forecasting	Order Processing	Production Control	O.R.
Corporate Planning	Marketing	Petrochemicals	Radar
Sales Ledger	Distribution	Linear Programming	Statistics
Purchase Ledger	Traffic Analysis	Simulation	
Projects Completed		Responsibilities	
PLEASE CHECK THAT EACH SECTION HAS BEEN TICKED APPROPRIATELY			
ADDITIONAL INFORMATION			
General			
Data Processing			
Terminals			
Software/Packages			
Application Areas			
Projects and Responsibilities			

EMS Group Requirements

Systems Support

6K to 10K Packages!

Phone 0782 623665, Don Philp

Programming Requirements

4K to 8K Packages!

Phone 021-454 7906, Damien Handlip

Freelance vacancies - many more each week

London - Cobol Progs., IBM, ICL, Honeywell, c£200 p.w. IDS, TDS Designers, c£225 p.w.

Midlands - ICL, Honeywell, IBM, Cobol, c£175 p.w.

Northern - IBM, Honeywell Progs., c£200 p.w.

Register for an immediate selection of new business opportunities. EMS have up to 40 vacancies outstanding throughout London, the Midlands, and North

IMS Designers, CICS Designers - Midlands and North West.
Honeywell IDS, TDS Designers - Numerous UK vacancies.
Analysts, all machines but commercial experience - North West.
IDS Designers - Surrey. Urgent.
OR, Linear Programming - Midlands.
Business Systems Analysts - EMS Birmingham Data Centre.
Package Designers - Birmingham and London.

Minis - Assembler, Cobol, Basic Plus - Birmingham Data Centre.
Honeywell Cobol - Birmingham Data Centre.
Industrial & Commercial Cobol Programmer - Birmingham Data Centre.
IDS & TDS Cobol Programmers - Numerous North West - Very Urgent.
IDS Cobol - Surrey.
ICL 1900 and New Range - UK.
IBM, OS/DOS Cobol Assembler.

EMS is
where the
careers are!

JOIN A 2950 IN REDDITCH

Our business is heavily dependent upon our ICL 1903A installed in 1971. We will replace it this year with a larger ICL 2950 system to support our planned expansion into the 1980s to include:

- * Merchandise control through 600 POS terminals
- * Management information systems using on-line facilities
- * We need to invest in people and we welcome your experience

SYSTEMS * PROGRAMMING * OPERATIONS

SYSTEMS ANALYSTS up to £6000

Ideally you should have at least 2 years' Systems experience, but we will also consider less experienced candidates, knowledge of retailing would be useful. Salary will depend on your experience.

TRAINEE SYSTEMS ANALYSTS Salary negotiable

We would also like to hear from candidates with a programming background and the ability to move into systems. Analysts & Trainees. Contact Tony Russell or John Shakespeare (Extension 140).

PROGRAMMERS & SENIOR PROGRAMMERS up to £5500

At least 18 months' COBOL experience is needed. If you have more (at least 3 years) and the ability to supervise a small team, you will be interested in the senior job. Salaries again depend on experience. Contact Barrie Walker (extension 77).

OPERATORS up to £4500

Again, 18 months' experience, including job set-up and file control. Applicants must be prepared to work shifts. Contact Malcolm Rebeiro (extension 115).

WHO ARE WE? WHERE ARE WE?

We are Europe's leading retailer in the Auto, Cycle and Leisure markets. The jobs are at our Head Office in Redditch, in rural Worcestershire, Birmingham and the West Midlands are all within easy reach.

WE OFFER!

- * Progressive salary scales
- * Staff discount scheme
- * Pleasant working conditions
- * Subsidised restaurant
- * Relocation assistance, or help in obtaining quality local authority housing in appropriate cases

Contact person named on Redditch (0527) 2780 or write to him at Halfords Ltd., Icknield Street Drive, Washford Wets, Redditch, Worcs B98 0DE.

HALFORDS

A BURMAH GROUP COMPANY

COBOL PROGRAMMING INSTRUCTOR

£5,000+ Sound Knowledge of Cobol is essential.

Why not put your experience to good use teaching others? Previous experience in teaching is desirable. Make an appointment to come and see us by phoning.

Write Cooke on 01492 1781

Knight is right for contract staff

Knight 01-491 4706

Staff Services Division of BOC Deutsche Credit and Bank, a member of Computing Services Association.

PROJECT LEADER £12,000-£18,000 ANALYST/ PROGRAMMERS £9,000-£12,500 Holland

As part of the European Data Processing operation, Mars operate a data processing bureau and systems consultancy from Veghel, Holland, to provide services to Mars selling and manufacturing companies in Belgium, Holland, France and Germany. The central installation is IBM mainframe based, and supports distributed conversational processing systems using IBM 3790's in these countries. Systems development, in the manufacturing areas, utilises DEC 11/70, PDP 11/34 and PDP 11/04 computers. Mars Veghel, itself, is close to the Belgian and German border, and one hour's drive from Amsterdam.

In order to meet the increased demand for our services we are seeking to expand our established international team by the recruitment of a further project leader and analyst programmers.

PROJECT LEADER

Your duties will include:

- * the analysis and design of new systems.
- * development, documentation, testing, and implementation of these new systems.
- * functional supervision of analyst/programmers and programs during projects.
- * responsibility for a number of operational systems.

ANALYST/PROGRAMMERS

Your duties will include:

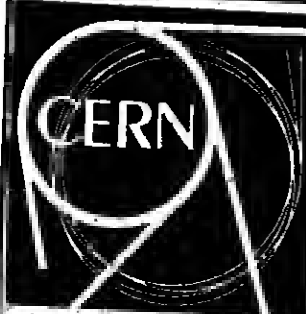
- * detail analysis, programming, testing, implementation and documentation of new systems.
- * enhancement and maintenance of a number of existing systems.

For both positions, applicants, aged up to 35, should have relevant experience in the area indicated, including the use of COBOL and/or FORTRAN.

Working conditions are excellent. A non-contributory pension and sickness assurance scheme are offered as well as generous relocation expenses, including a disturbance allowance.

Interviews will be held initially in London, and applicants should reply giving brief details of career to date to: Nigel Hertley at Austin Knight, 66a High Street, Egham who are assisting us in this recruitment.

Mars



European Organization for Nuclear Research
Organisation Européenne
pour la Recherche Nucléaire

At CERN, the controls of a large particle accelerator complex are being overhauled. This involves installation of 16-20 mini-computers and a systematic application of micro-computers for the process interface. Special attention is being given to systematic diagnosis in hardware and software. The team working on these aspects is looking for a young

SYSTEMS ENGINEER

His education: University degree in Electronics, computer science or equivalent. Experience: Several years in engineering of software and hardware; where the software experience should be related to the design or improvement of real-time systems, and the hardware experience to reliability and diagnosis of mini- and micro-computers and their systems. Good knowledge of English or French. Assignment: To develop the framework for, and to install diagnostic software on a large, modular process interface. To set up and exploit programming environments for micro-computers as well as to participate in their introduction and implementation. Please write for an application form to the address below, quoting the reference: PS-CCI-88.

Head of Personnel, CERN, 1211 Geneva 23, Switzerland

Computer Live-Ware Where are you?

As Europe's foremost systems company, EASAMS is especially interested in locating people who have graduated during the last few years and have used their subsequent industrial experience to gain a greater understanding of the application, design, implementation and testing of computer software.

Particular areas of interest include:

- 1) Real-time programming of mini-computers in Assembler language for Avionics applications.
- 2) Management Information Systems programming in PL1 on IBM mainframes.
- 3) Mathematical modelling and simulation using Fortran.
- 4) Installation of methods and procedures to ensure the quality of software.
- 5) Operating systems for in-house facilities; serving as an interface between the facilities and users.

We have many vacancies in these and other related areas.

If you have any worries about moving, we will consider help with relocation expenses.

Interested? Then get in touch immediately with Anne Wilton, Camberley 83377 Ext. 54 or write to her at Easams Ltd, Lyon Way, Frimley Road, Camberley, Surrey, quoting reference CW35

EASAMS

A GEC-Marconi Electronic Company



Software salesmen + Technical support staff

Due to our continued expansion in the fastest growing area in DP, we need to further SOFTWARE SALESMAN to cover the south of England.

The successful applicant will know the IBM 360/370 market place, and will have initiative in an area that will provide good rewards.

In addition UCC is looking for TECHNICAL SUPPORT staff to support our customers and marketing staff in maintaining some of the world's leading operating software products. These include UCC ONE (Topo Management Software) and UCC TWO (DOS under OS), which have consistently been voted into the Datapro Roll of Honour. Experience required from our technical staff is a good knowledge of Assembler and preferably experience as a systems programmer.

These vacancies are based in the Nurbury office, and if you are interested please write to David McBrean.

UCC UNIVERSITY COMPUTING COMPANY Software Products International

University Computing Company (Great Britain) Limited
1258 London Road, Nurbury London SW16 4XN. Tel: 01-879 1766.

COMPUTER PROGRAMMERS £4,500-£5,500

Required with Commercial Systems, ASSEMBLER COBOL experience. To join small enthusiastic comp. manufacturing company.

Contact Brian Bonfield
Henri Hampstead
0442 85285

or apply in writing to
SENODATA LTD.

44 Stephens Chambers
Bank Court

Wareham, Dorset, Dorset, Hants.

LANCHESTER POLYTECHNIC

Faculty of Applied Science
Department of Computer Science

Lecturer II in Computer Science

The successful applicant will be expected to contribute fully to the work of the Department in all aspects of research, supervision and/or previous teaching experience in Systems Analysis work in a commercial environment. Applicants should have a sound knowledge of operational applications and programming languages.

Salary: Grade 11/12 £10,100-£12,100 per annum (inclusive of superannuation).

The application form and further particulars apply in writing enclosing a letterhead statement and address to the Personnel Officer, Lanchester Polytechnic, Priory Street, Lanchester, Staffordshire, ST1 3JG, or by 21st June 1978.



Data Processing Recruitment Consultants

Programmers-Analysts-Consultants Holland

Salary: £9.5 - 15K + Exceptional Benefits

Our clients, pioneers in frontier communications developments have contributed significantly to the accelerated advancements in Mini Computer technology and are internationally recognised as market leaders in their field. In pursuit of maintaining their forefront leadership our clients seek to identify key personnel to join them in their next development phase.

Real-time specialists with strong Mini Computer backgrounds will make a vital contribution to the attainment of these goals within an environment offering the highest standards of professionalism, job satisfaction and development potential. Successful candidates will ideally demonstrate concentrated expertise with a narrow band-width of specialisation rather than general experience across a broad spectrum. Furthermore they will either be

graduates (Computer Science or related discipline) or will offer exceptional relevant experience in law. Consultants, team leaders and senior analysts are likely to be currently engaged in Data Communications or Real-Time mini software development within either a systems and software group or end-user environment implementing sophisticated applications software. Analyst/programmers and programmers will certainly offer extensive Assembler expertise within these areas of specialisation. In addition to above-market salaries our clients will pay full removal expenses for you and your family and provide, where necessary, a resettlement advance. The costs associated with temporary accommodation will be met by the company pending location of permanent housing. (Ref 12/A)

Analyst Programmer Cairo

Salary: c£15K + Accommodation

Our Client is an Important European Systems and Hardware Specialist group currently undertaking a major computerisation programme in Cairo for a major Banking Institution. The Hardware selected for this project is based on NCR's CRITERION range.

The successful candidate is likely to have a sound financial background with relevant NCR experience

and solid COBOL programming expertise. Single status would be advantageous but not essential as married accommodation is available. In addition to a very high salary our Client provides excellent furnished accommodation and after the initial 1 year tour of duty offers an option to transfer to either Scandinavia or Kuwait. (Ref 12/B)

Micro or Mini Specialists London+Home Counties

Salaries: £5-8K + O'seas travel

Candidates with 18 months or more practical applications or software development/design experience in either a Computer manufacturing or Software Systems House environment are invited to discuss career advancement with our Clients who have headquarters in London and offices in the Home Counties and Europe. Those who have Assembler language experience on Mini or Micro Computers particularly DEC PDP11,

D-G NOVA/ECLIPSE and TI 800/9900 or Micro Processors preferably Intel 8080/85, Z1LOG Z80 or Motorola 6800 will be ideally suited. In addition to above-market starting salaries our Client offers excellent career advancement prospects and the opportunity to travel within Western Europe. We would like to hear from interested applicants as soon as possible with a view to arranging an early interview. (Ref 12/C)

U.S. Banking Corporation City of London

Salaries: £6.5-8K + Mortgage

A major U.S. Banking Corporation with extensive computer facilities in the City requires additional D.P. personnel up to team leader level for both their Mini and Mainframe divisions.

The Mini Division in particular requires COBOL programmers and Project Leaders possibly with a financial background. The Mainframe Division is in need of PL/I programmers with possibly COBOL or BAL as a second language. Whilst the IBM 370 operating system is O.S., our Client may consider competent DOS programmers.

The ability to work as a member of a project team under strict documentation and programming standards is important. Mini programmers will have at least two years real-time experience using COBOL and may also have experience of ASSEMBLER. In addition to above-market salaries the Bank offers a 2% subsidised mortgage facility and personal loan scheme, private health and a non-contributory pension plan. (Ref 12/D)

Applications+Systems Programmers Contract-Holland

£375-450 p.w. Minimum 6 months

PL/I PROGRAMMERS with DOS/VS and CICS/VS experience are required immediately for installation undergoing conversion from DOS/VS to O.S./VS1. Experience of DOS is not a prerequisite but could be useful. SENIOR SYSTEMS PROGRAMMERS with O.S./VS1 experience in addition to exposure to IMSD/VS and possibly CICS/VS. This is a very senior position and commands a high price ticket. We can also discuss possible other benefits available. (Ref 12/E)

Logistix, Freeport 32, London W1E 3YZ
01 491 4636
(Revenue charged)



Avon House, 366 Oxford Street, London W1N 9HA

Operating Systems Support 1900-2900

£4000-£5000

Slough

Our client, Berlei (UK) Ltd., have their current computer operations based on an ICL 1902T (128K) running under George II+ and ending a 2950 (34m), which will initially run under DME, progressing to VME/K.

To strengthen their operations support, they require someone to take responsibility for a George II+ system, reporting to the senior systems programmer. Initially George II+ will run on both machines, with the opportunity to work on VME/K at a later date.

The successful candidate should have a varied technical background, perhaps as a competent senior operator or a programmer with a strong operations background. A knowledge of George II (or George III) is required in addition to at least 2 years' working on 1900s. Educational background should be at least to 'O' level standard.

The continual efficiency of the company's current and future systems will rely heavily on operating systems support, and the appointed candidate will enjoy a challenging position in a company that keep abreast with current technology while offering employment benefits including a subsidised canteen, flexi-time and regular salary reviews.

CONTRACT

Saudi Arabia

£15,000 per month

Tax Free

Our clients require a programmer/engineer for a minimum of three months and probably six.

The job will involve

Writing comprehensive programmes in the structural and civil engineering fields.

Modification of programmes and packages to suit on-site requirements.

Training engineers in the use of the computer.

The applicant should have

AB. Sc., preferably in Civil Engineering

A thorough knowledge of Basic language is preferable

A minimum of three years' experience in DP working on Engineering applications

Familiarity with Hewlett Packard hardware

A salary of £15,000 per month, tax free, will be paid plus return air fare, accommodation and a daily allowance.

Initial interviews will be held in London or Dublin, so please telephone Graeme Ridler on 01-459 3212 for an immediate interview.

Central Computing Consultants

KINGSTON: 44 Wood Street, Kingston upon Thames, Surrey, England. Telephone 01-549 3212 Telex 27950
DUBLIN: Canberra House, 24 Lower Leeson Street, Dublin 2. Telephone 789577 (5 Lines)



SENIOR SYSTEMS ANALYST

West End

£6000 to £7300

An opportunity has arisen for an experienced and articulate Systems Analyst to progress into a more demanding and responsible position, leading and co-ordinating the work of a team of three other analysts.

The installation comprises an ICL 1903 machine running under GEORGE II, and an extensive Real Time system utilising DRIVER and COMMS MANAGER. Experience in any of these areas would be highly desirable, as would a programming background in either COBOL or PLAN.

You should have at least 4 years total DP experience, 2 years of which should be in Systems Analysis, and during this time you ought to have installed 2 major systems. The work will cover many different projects and will involve a wide area of systems and applications.

Reference JC 23/1

COBOL PROGRAMMERS

City

£4000-£5000 plus Mortgage

A major financial organisation with an expanding ICL 2900 system is seeking several programmers for their city-based installation.

These positions will be ideal for people with at least one year's commercial experience gained preferably on ICL equipment.

The company offers a high starting salary and an excellent benefits package including: Season Ticket Loans, Flexi-time and a Mortgage Subsidy Scheme.

PL1 PROGRAMMERS

City

Reference JC23/2

£25000 plus mortgage

A major financial organisation needs programmers with 2 years good commercial experience to join their expanding DP department in the City.

They currently operate a twin IBM 370/138 system, running under DOS/VS, and have a comprehensive communications network, so any knowledge of CICS would also be an advantage.

In addition to a competitive starting salary and excellent career prospects, the company offers: Inter-city Season Ticket Loans, free Life Insurance and Annual Bonus scheme, and a 3% Mortgage.

Reference JC 23/5

SYSTEMS PROGRAMMER

City

A large and highly respected financial institution is seeking a capable and imaginative OS/VS Systems Programmer to work in their City based installation. They are using two IBM machines - a 370/148 and a 370/168, running under OS/VS1 with VM/CMS. The ideal candidate would have a general programming background preferably in ASSEMBLER or PL1, with a minimum of around 18 months in OS or OS/VS Systems Programming. Knowledge of IBM 370 Hardware and Software fundamentals is desirable as is any experience of performance measurement and estimation techniques. Salary will be totally dependent upon ability and experience, and will not prove a limiting factor for the right person.

FORTRAN PROGRAMMERS

London

Reference JC23/4

£4000-£6500

A major engineering company located just south of the river near London Bridge Station is an experienced Fortran programmer. The suitable applicant should have a degree in Applied Mathematics or Engineering and at least two years experience in Fortran, preferably on IBM equipment.

Working with users and other programmers you would gain experience in Scientific Applications, Stressing, Thermo Dynamics etc and could expect good career progression and an above average salary.

COMMUNICATIONS PROGRAMMERS

Hertfordshire & North Kent

Reference PG 23/3

£4000-£8000

A market leader in computer based communications equipment have a number of opportunities for engineers and programmers in the following areas:

Real Time

Software Engineering

Micro Processors

Distributive Processing

Compiler Software

Data Communications

Experience in any of the above, possibly coupled with a degree, would lead to an excellent salary together with a generous benefit package which includes Flexi-time, 24 days Holiday, L.V.'s, Generous relocation expenses and Subsidised Company products.

Reference PG 23/6

SYSTEM SUPPORT GROUP Group Leaders & Assistants

LONDON SE1

The Computing Branch operates an ICL 1903T computer under GEORGE 3 with a variety of remote terminals. Additional staff are required to maintain software, compilers, packages and utilities for the computer and to give support services to terminal users, including data communications aspects.

Applicants should have had experience with computer operating systems or data communication systems and must have a good education, preferably having obtained A level mathematics and O level English Longwood qualifications.

Group Leader. Salary within a scale rising from £5956 to £7608 per annum according to experience. Vacancy No. 1224/78/CW

Assistant. Salary within a scale rising from £4580 to £5590 per annum according to experience. Vacancy No. 1214/78/CW

The Salaries quoted are inclusive of London Allowance and a Self Financing Productivity Payment.

Applications giving full details should be forwarded to the Personnel Officer (Recruitment), Central Electricity Generating Board, Bankside House, Sumner Street, London SE1 to arrive by 22 June 1978.

South Eastern Region



OPERATORS

EIGHT IBM OS JUNIOR AND

SENIOR OPS

£3800-£6000

London and Home Counties.

THREE ICL 2904 OPS

£3400-£4500

London.

THREE PDP 11 SERIES OPS

£3300-£4500

London

FOUR IBM DOS JUNIOR AND

SENIOR OPS

£3200-£4800

London and Home Counties.

THE ABOVE JOBS CARRY A WIDE RANGE OF BENEFITS - FROM CHEAP MORTGAGES TO FREE LUNCHES! FOR THESE, AND ANY OTHER COMPUTER JOB, RING MIKE OAKES TODAY!

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COMPUTER RECRUITMENT 01-353 6931
5 ST. BRIDE ST., LONDON EC4

UNIVERSITY COLLEGE LONDON

Department of Physics and Astronomy

JUNIOR PROGRAMMER

Required to join a small team providing software support to an elementary particle research group. We require a candidate with a degree in Physics or a related subject and a strong background in programming languages such as FORTRAN, ALGOL, and PL/I. A degree in a computer science subject would be an advantage. The successful candidate will be responsible for the development and maintenance of software for the group's research programme. The salary is £3,200 per annum plus a 10% pension contribution. Applications should be sent to the Department of Physics and Astronomy, University College London, Gower Street, London WC1E 6BT.

Intermediate Systems Designer

Salary from £4,000-£4,500 plus increase

Applications are invited for the above post from graduates with a degree in Systems Design and the ability to operate with a team. The successful candidate will be responsible for the design and development of software for the group's research programme. The salary is £4,000 per annum plus a 10% pension contribution. Applications should be sent to the Department of Physics and Astronomy, University College London, Gower Street, London WC1E 6BT.

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Informatix UK & O'seas Index Phone 01-831 6055

Informatix 24 Gray's Inn Road London WC1X 8HR Telex 299539 HAVEN G



POSITION	SALARY	EMPLOYER	LOCATION	HARDWARE ENVIRONMENT	SOME OF THE QUALIFICATIONS	REF. NO.
Permanent/Contract Programmers	c £6,000	Software House	London & South	IBM OS	Urgently required experienced COBOL programmers for a variety of commercial applications.	1/23
Assembler Programmers	to £6,500	Manufacturer	Herts	Minis	Openings for ASSEMBLER programmers with 2 years' experience to develop software products.	2/23
Graphics/Communications Staff	c 50,000 guilders	Service Industry	Holland	Any Minis	Graphics and communications experts required to work on varied assignments in a dynamic environment.	3/23
PL/I Programmers	to £5,500+	Services	N and Central London	IBM OS	Excellent opportunities for experienced PL/I programmers to develop systems in a stimulating environment.	4/23
Systems Analysts	to £6,000 + LV, etc.	Food Industry	N. Surrey	IBM OS	Opportunities for analysts with 1 year's + experience and a programming background to join a progressive organisation.	5/23
Fortran Programmers	c £5,000	Engineering	W. London	Minis	FORTRAN programmers with a minimum 1 year's experience required to develop/assist with engineering and associated projects.	6/23
Analyst/Analyst Programmers	to £6,500	Bureau	N. London	IBM OS	People with analysts/team leadership experience required to work on interesting applications.	7/23
Programmers	£5,500 + mort.	Insurance	EC2	ICL 1900	1900 COBOL programmers with minimum 18 months' experience required to join this expanding DP department to work on on-line systems.	8/23
Permanent/Contract Programmers	to £7,000	Software House Bureau	City	Burroughs	Our client urgently requires staff with experience of Burroughs medium range equipment to work on interesting commercial applications.	9/23
Systems Analysts	c £6,600+	Manufacturer	Middx. Europe	Minis	First-class opportunities for analysts with O/L warehousing/inventory control to develop/design systems and implement throughout Europe.	10/23
Programmers	to £8,000	Retail Trade	London	IBM	Programmers with 1+ years' COBOL or ASSEMBLER experience required to develop interesting systems using on-line/TP techniques.	11/23
Programmers	to £8,500	Commercial Services	Swsex based	DB/PDP etc.	Programmers with ASSEMBLER/COBOL experience required to develop commercial systems for a wide range of minis.	12/23
NEAT 3 Programmers	£10,000 + accom.	Software House	Middle East	NCR	Urgent requirement for a 2 years' + NEAT 3 programmer to work on various applications in UK/Middle East.	13/23
Contract Personnel	£180+ pw	Various	London SE England	IBM, ICL, Burroughs, DEC, Honeywell	COBOL, RPG II, Assembler, BASIC + programmers with 2 years' + experience urgently required.	14/23
Systems Programmer	to DM 65,000	Banking	Germany	IBM 370/168	Experience required in T/P, software engineering, operating systems and knowledge of German.	15/23
Project Leader	c £7,000 + mort.	International Bank	EC3 & Overseas	IBM 370 DOS VS	2 years' relevant experience required within financial environment, including project responsibility. Analytical ability and qualities of leadership.	16/23
Consultants, Analysts, Analyst Programmers, Programmers	to £8,000 + overseas allowance	Software House	London & Middle East	Any	Urgently required experienced staff for an expanding UK and overseas software house. Excellent opportunities for ambitious D.P. professionals with a minimum of 2 years' + relevant experience.	17/23

NETHERLANDS

MINI PROGRAMMERS • ANALYSTS & CONSULTANTS

to £15,000

Our clients, market leaders in systems and software development, with regional headquarters in Holland are embarking on a further expansion programme for which they require numerous additional personnel. In particular they wish to recruit Mini Software and Applications Specialists, Analysts and Senior Analysts and Consultants with in-depth experience in any of the following areas:

*Message Switching
*Computer Networks

*Data Communications
*Mini Computer Software

*Process Control

Assembler level programming experience is of primary importance and candidates will be expected to demonstrate enthusiasm towards the prospect of settling in Holland for an extended period. All removal expenses, initial accommodation, etc., will be met by our clients. Interviews will be held in London as far as possible and offers will be made to successful applicants no later than end-June.

Ref 18/13

Datascene Recruitment Ltd
Sceptre House
169-173 Regent Street
London W1R 7FB

datascene 01-439 7871
24 hour answer phone

Programmer for expanding installation

c £4000 p.a. Rural Wiltshire

Avon Rubber Company Limited is the headquarters of the Avon Group of Companies, situated in the Wiltshire countryside 12 miles from Bath and about 6 miles from the M4.

Our current configuration comprises an ICL 1902T, 48K, 2510 DECKS, EDS 60s, 2 x LPs, card and paper tape, running under George 2 operating system. Redundant key to disc and communications also apply. We intend to install an ICL 2804 to augment the power for our existing batchwork, and our telecommunication systems are being developed. The above equipment will be replaced by a large scale ICL 2800 in due course.

Applicants, men or women, preferably in their early to mid-thirties, should have a minimum of two years' experience of ICL 1800 series equipment and Cobol programming with knowledge of ICL software, George 2, 2800 series equipment and 7500 communications.

This is an opportunity to work in a friendly and progressive department, far removed from the stresses of City life. Benefits include a 38 1/2 hour week, a four weeks' holiday after one year's service, a sick pay/diagnostic scheme, a contributory pension and free life assurance, a subsidised canteen, a generous relocation expenses, where appropriate.

For an application form, please write very briefly, to K. G. Walker, Staff Personnel Officer, Avon Rubber Company Limited, Bath Road, Melksham, Wiltshire, SN12 8AA.

AVON

COUNTY TREASURER'S DEPARTMENT Senior Systems Analyst

Post Ref. T248 Grade SO1/2 Salary £4758-£5612 (inclusive of supplements)

Systems Analysts

Post Refs: T252, T253, T255 Grade AP4/5 Salary £3861-£4615 (inclusive of supplements)

Applications are invited from people having relevant data processing experience who are interested in joining a team which is responsible for the development of an extensive range of systems serving all departments of the County Council.

More than 50 terminals are currently supported by the ICL 1904S which runs under the George 3 operating system. This configuration is due to be enhanced to 256K with additional peripheral equipment. Further development involving the use of terminals is planned, and where applicable new techniques will be introduced to assist in the implementation of these applications, and any necessary training will be given to ensure that sound, practical solutions are implemented.

If you are interested in a career in a varied and stimulating environment with real time systems, on line programming, data base techniques and other benefits associated with a large local government installation, please write or telephone for an application form quoting the appropriate post reference to the Chief Executive, (Personnel), South Yorkshire County Council, County Hall, Barnsley S70 2TN. Telephone Barnsley (0228) 86141 Ext. 236.

Closing date for applications is 23rd June, 1978.

South Yorkshire County Council ENERGY IN ACTION

COMPUTER OPERATORS

Required by Lloyd underwriters to work at their London, E.C.3 Computer Centre.

LOCATION 1 minutes from Fenchurch Street Station and Tower Hill Tube.

EXPERIENCE Minimum 1 year ICL 1900 manual and George II.

REMUNERATION Good salary and additional benefits.

Please phone Mr. Riddell on 01-709 9640.

CAN YOU SELL A COMPUTER SERVICE

AS A PROBLEM SOLVER FOR BUSINESS PLANNING, MANUFACTURING OR ENGINEERING?

If you could earn between £900 and £1000 p.a. for quota performance, with no ceiling on your earnings (good basic salary plus commission).

Atkins Computing, established as one of the leading timesharing and remote access service companies in the United Kingdom, are continuing their planned expansion in the South East and North of England. Following one of our most successful years, the development plan for 1978/79 requires immediately the recruitment of experienced Sales Executives, male or female, who are currently in the computer or allied industries.

As professional Sales Executive with Atkins Computing, you will be responsible for both the continued growth of our business in your area and for ensuring a high standard of service to our

existing client base. Full sales and product training will be given to the successful applicants and a company car is provided as well as all normal sales expenses.

As an important member of the On-Line Systems Inc. Group, we offer progressive employment conditions and benefits. Interests? Then contact:

For the South East: Chris Penning, Regional Manager, Atkins Computing Services Ltd., Four most House, 12/22 West Street, Epsom, Surrey, Tel: Epsom 29678

For the North: David Lloyd, Regional Manager, Atkins Computing Services Ltd., Four most House, 1-3 Dolmans Lane, Warrington, Cheshire WA1 2EU. Tel: (0925) 34418

Atkins Computing On-Line Systems

The British Council Senior Programmers

The British Council is a worldwide educational and cultural organisation. We are looking for two senior programmers to work with a small team in our Data Processing Department in London.

The emphasis of each post will vary according to current requirements but the duties will comprise: technical supervision, program maintenance and development of the Council's existing systems; provision of consultative services to programmers and trainee programmers; maintenance of systems software for an in-house installation planned for January 1979; assistance in the programming of new applications.

Applicants should have at least five years' programming experience together with a sound knowledge of ICL COBOL, ICL 1800 SERIES software and GEORGE 3 operating system. They should also be able to communicate effectively and supervise trainee programmers. Knowledge of other programming languages, experience of systems design and on-line real time processing would be advantages.

Starting salary is at present £5887 rising by annual increments to £6887 but a pay rise is pending. 22 days' annual leave plus 2 1/2 privilege days. Non-contributory pension scheme.

For further details and an application form, to be returned by 30 June, telephone or write quoting HS/9 to:

The British Council Staff Recruiting Department, 85 Davies Street, London W1V 2AA. Telephone: 01-499 8011, ext. 3028

The equivalent of 370/158/ in a matchbox

Today we are working on advanced microcomputer systems that will make this headline a reality by 1980 - a date we are committed to by a multi-million pound advance order book.

We are looking for research staff capable of using the very edge of Micro Electronic Techniques and writing equally advanced software.

Whilst experience in some form of computing is probably a help, the revolutionary concepts of the project make people far more important than their background.

Sounds like your type of career?

Phone 01-837 0451 now for an interview and decision within 7 days.

Total Systems Limited, 398 City Road, London EC1V 2QA.

Programmer / Analysts

Salary £5,142-£5,472 per annum (currently under review)

are required for our offices at Rosebery Avenue, London. C.I. Hardware includes two I.B.M. 370/148's, 36,000 magabytes of on-line storage, 8 tape drives and an extensive network of on-line and remote V.D.U.'s.

Development is based on Informatica Mark IV file management system. Programming in batch mode is being phased out in favour of on-line methods under I.B.M. s VM/CMS. Assembler is used for application modules running under the SHADOW teleprocessing monitor. Programmers and analysts used to COBOL or PL/I usually have little difficulty in mastering Mark IV techniques and an increase in job satisfaction. Additional information is obtainable by telephone, from Mr. M. O'Meara on 01-937 3300, extension 2331.

Generous holidays, Pension scheme - interchange arrangements. Staff restaurant.

Applications, quoting reference CW and giving full particulars of age, educational qualifications and previous experience should be sent not later than 18th June, 1978, to: Laurence O. Wild, C.E., F.I.C.E., F.I.Mech. E., F.I.V.E.S., Divisional Manager, Room 589, Thames Water Authority, Metropolitan Water Division, 173 Rosebery Avenue, London, E.C.1.

These posts are open to male and female applicants.

Thames Water

BOROUGH TREASURER'S DEPARTMENT

Computer Operations Manager

Re-advertisement SO.2 £5,494-£5,797

Applications are invited for the above post in the Computer Division of Borough Treasurer's Department from men and women with five years' or more experience in a computer operations environment, plus an in-depth knowledge of the George 3 Operating System and on-line communications networks.

Installation consists of an ICL 1903T 96K computer supporting an on-line VDU/MOP network and multiprogramming batch processing under the George 3 operating system. Responsibilities include: machine scheduling, network control, security, machine performance, advice on computer hardware requirements and overall supervision of a Key-in-Disc data preparation section, etc.

Detailed job description and application form from Assistant Chief Executive (Manpower), Town Hall, Bromley BR1 1SB. Tel: 01-484 3333, ext. 3318.

Closing date 22nd June, 1978.

LONDON BOROUGH OF BROMLEY

DUSSELDORF

GERMANY

IBM/OS tash master programmer for 6 months contract in Dusseldorf, excellent negotiable salary.

Focus Computer Consultants 01-487 5781

VICTORIA APPOINTMENTS LIMITED MANCHESTER

Operations Manager Salary c. £6000

Our Client, a leading company in the Transportation field is looking for an Operations Manager. It is anticipated that the successful candidate will be aged over 25 years and educated to 'A' level or equivalent. He/She must be able to demonstrate organisational abilities and have strong supervisory and management experience, preferably gained in a mainframe/communications environment.

The Department has a large mainframe supporting a sophisticated communications network offering scope for a self-starter able to keep abreast of new techniques to use his initiative in the progressive installation.

Applications, in writing only, with full personal and career details should be marked PO578 and addressed to: Miss Val Matthews, Victoria Appointments Limited, 24 Mosley Street, Manchester 2. Telephone 061-236 7319 (24 hr. Answering Service) and 061-236 7417.

Join HEXAGONS £200+ clubor maybe the £300+ club

Our senior programmer analyst consultants will be joining into the £200+ club this year. Why don't you join them?

You may be amongst some of the highest paid DP professionals in Britain. You may enjoy working on some of the most advanced and interesting computer systems being developed.

Do you want to work in one of these environments? IMS, RAMIS, CICS, IDS, MVS, JCL, Batch Processing, SHADOW, IDMS, TOTAL, Taskmaster.

All Hexagon consultants whether they are Senior Analysts or Junior Programmers enjoy the following:-

1. The choice of monthly fortnightly or weekly salary payments.
2. The choice of monthly fortnightly or weekly salary payments.
3. A satisfactory remuneration bonus on all projects.
4. Opportunities to work on interesting and varied systems in multi-language disciplines and some of the latest hardware.
5. Opportunities to work on interesting and varied systems in multi-language disciplines and some of the latest hardware.

Apply today - or at any other time ring 01-439 3671 or send your CV to:

HEXAGON computer services 5th FLOOR SUITE 145 WARDOUR STREET

MYRIAD OPERATIONS

Computer Personnel Consultants

KEY-BATCH PROGRAMMER AND DATA CONTROLLER

S.W. LONDON £4300

This is an interesting opportunity to join a major international engineering concern, with substantial involvement in the petro-chemical industry. In the United Kingdom their data processing is based on Dnn 100 equipment linked to powerful IBM 370 processors in the U.S.A.

The primary responsibility of the Key-Batch Programmer will be to write and maintain front programs for the Key-Batch system. Secondary responsibility will be to assist the Data Control team in job set-up, JCL maintenance, and other control functions.

The successful applicant should have a working knowledge of any key-to-disc system, and be familiar with control procedures including IBM 370 JCL.

This is a new position, made necessary by an increasing work load, and future prospects within this expanding department are first-class.

24-hour answering service Please telephone for a confidential discussion or write: 30 Fleet Street London EC4A 3DF 01-353 0981

OPERATORS

RECRUITMENT CONSULTANT £8000-£10000

If you have knowledge of Recruitment with a Consultancy/Agency background, or have experience as an Operator or Systems Analyst/Programmer, then your experience could be worth a great deal both in job satisfaction and remuneration. In order to maintain the efficient and personal service that my company is known for within the Recruitment field, I must now find a further three interviewers/consultants to be based in the City.

If you feel that you wish to enter an expanding company that offers unlimited potential in a stimulating environment, call Martin Grayson to arrange an informal interview.

staffs recruitment COMPUTER RECRUITMENT 38 COPTHALL AVENUE, LONDON EC1 01-638 2997

ABERDEEN ROBERT GORDON'S INSTITUTE OF TECHNOLOGY

COMPUTER SERVICES UNIT SYSTEMS PROGRAMMER

(£3802-£4944)

Computer Science graduate with good experience on DEC/10/20 software systems to maintain and develop system software.

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Further particulars from The Secretary, The University, Aberdeen, with whom applications (2 copies) should be lodged by 26 June, 1978.

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Commencing salary within the above range depending upon qualifications and experience. Assistance with housing accommodation, payment of removal expenses, lodging and travelling allowances in approved cases.

Application forms from the Chief Personnel Officer, Town Hall, Stoke-on-Trent, ST4 1HH or telephone 0782 48241 - Ext. 481.

Closing date 15th June, 1978. It is a requirement of the City Council that the person appointed to the above post shall be or become a member of an appropriate, specified trade union.

S. W. TITCHENER
Town Clerk and Chief Executive Officer

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Ascii through the Logic Gate

An epic in 32K words, by Richard Forsyth
"In the beginning was the word, and the word was four bytes, and thirty-two were the bits thereof." - IBM Technical Report.

Block 1 (Label Records Are Standard)

HEX has set off with Ascii from Silicon Valley to rescue Cleo from the clutches of Sheriff Sprocket and Wild Bill Bootstrap, as the first stage of his plan to overthrow the System.

Hex and Ascii passed through a narrow crossing between the northern peaks of the Sierra Nueva at about midday, and then began to descend. They reached the hills overlooking Sprocket's Hole early that afternoon. For a while Hex lay on his belly, scouting out the land.

There was very little shelter to be seen. He had hoped that he could creep unobserved right up to the smaller hut and wait in the shadows to accost Cleo as she went about her daily work. But he had forgotten how bare the landscape was. Clearly that approach was out of the question. The next best thing was a night time ambush.

He could observe the movements of Cleo and the two androids from his concealed position in the hills during daylight, then storm in under cover of darkness and seize her before either of her jallars had time to react.

If it came to a fight he felt confident that the advantage of surprise and Ascii's bionic teeth would see them through. He settled down to watch. Now and then he caught sight of a figure moving between the huts. From a distance it was not easy to identify but he thought it looked like Bill Bootstrap. As sunset approached and there was still no sign of Cleo, Hex began to worry. He had only the word of Inspector MacRo that she was to return here. Perhaps MacRo's order had never been carried out? Or perhaps it had been a lie, merely to placate him, and she had been executed? After all, the Night Operators had exterminated a whole city of people - why halt at one more death?

He turned his lenses to full magnification, but the air was too warm and turbulent for a clear view. He nearly wished he could hook up over the Network in a nice fast array-processor and analyse the image in 3D.

Then, just as the sun began to sink behind the mountains, a figure with hair-arms, wearing what seemed to be a



white blouse, appeared briefly at the window of the larger hut to draw the curtains. He only caught a momentary glimpse; but it had to be Cleo.

The light was fading. He had to decide whether to go ahead with the attack. He stood up and whistled softly for Ascii, who had wandered off while Hex was busy surveying the valley. There was no answering bark, but shortly afterwards the dim glow of Ascii's eyes at low power became visible. He had caught a rabbit. He opened his mouth and proudly deposited his prize before his master. Hex was thinking that a succulent leg of rabbit, deep roasted by Ascii's lasers, might not go amiss before their exploit when the creature shook itself upright, stood for a moment petrified then bolted into the night. So much for Ascii's razor-sharp fangs!

"Okay, old friend," said Hex, "we're going to get Cleo. Remember: this has to be absolutely silent."

He started to crawl down slowly on hands and knees. Ascii followed obediently, close behind. When they were still about 100 metres from the main cabin he halted. To go any closer would expose them to the light and risk detection. Their only choice was to wait till the lights went out, give the androids time to fall asleep, then pounce. Hex prepared for a long vigil. As the stars wheeled imperceptibly overhead, he grew colder. He rubbed his hands to bring back some life into them.

Then he felt something metallic nudge him in the ribs from behind.

"All right," he whispered to Ascii, "don't get impatient. We can't go in until they put out the lights."

"You're going in right now," said a gruff voice. Hex turned round. He found himself facing Bill Bootstrap who held an old fashioned shotgun aimed directly at his midriff.

"Tell your friend that if he gives any trouble I'll blow you to bits."

Hex swallowed hard, raised his arms above his head and said to Ascii in an untruffled manner as he could: "Don't try anything rash, old boy."

He was menhanded roughly to the doorway where a sharp shove in the ribs propelled him staggering into the lamplight. Inside sat Davy Sprocket, a rifle on his lap. Hex blinked. There was no Cleo.

Sheriff Sprocket stood up and trained his firearm on Hex. Ascii entered meekly, followed by Bill Bootstrap who slammed the door.

"Our orders are to keep you here under guard till the arrival of Commander Kludge," stated Sheriff Sprocket. "The first thing you have to do is power down your dog."

"Impossible!" protested Hex, "his memory is volatile." "Either that or we shoot you. We were told to bring you in dead if we couldn't get you alive."

Reluctantly Hex bent over his benumbed dog and initiated the emergency power-fail procedure. There was a lump in his throat as Ascii finally whirled to a stop. Now they were really trapped.

"Good," said Sprocket, "we can all sit down now."

Hex took a stool next to Ascii's recumbent form, while Sprocket eased himself into a rocking chair across the room, still holding the rifle. Bill Bootstrap propped his gun against the doorpost, and Hex watched as he went outside again. When he returned a few moments later his pipe was in his mouth. He picked up his shotgun and seated himself at their hash table, puffing contentedly.

"Where's Cleo?" asked Hex, breaking the heavy silence.

"Good question," replied Sprocket. "You seen her recently Bill?"

"Now let me see," answered the other. "Cleo?" He stared at the ceiling in mock puzzlement. "If I recall rightly she used to work here once."

"That's the one," responded Sprocket, grinning as Bootstrap handed him the pipe.

Hex made no further attempt at conversation.

Can this really be the end for the Kid and Ascii? You'll wish it was when you read next week's breathtaking episode.

© 1978, Richard Forsyth, RAE Timesharing.

How lorry firm found a use for check digits

HOW to maintain and increase speed and reliability of service to its customers in a cost effective manner was the problem that faced Wilkinson Transport at the outset of an expansion programme, five years ago.

The prime marketing objective of any transport company is to improve continually the service levels the company can give by determining what service customers are seeking.

The second marketing objective is to obtain a maximum flow of traffic throughout the year.

However, delivering parcels is no nine-to-five exercise. Throughout the year, vehicles from 800-plus fleet, make the inter-plant link to transfer parcels and small freight collected that day.

More than 80 per cent of deliveries are completed within 24 hours and over 98 per cent within 48 hours. The average customer stands with consignments in the plant for 2,000 hours a year.

With a network of 17 depots covering the country, each serving a separate geographical area, stretching from Glasgow in the north to London in the south, good documentation and experienced traffic control are vital elements towards prompt reliable service.

It became increasingly obvious that if the administration were to cope with

extra expansion, a highly sophisticated system would have to be introduced to eliminate risk areas.

It was necessary to coordinate all small consignments being delivered all over the country. This of course presented a variety of problems.

Consignment notes were related to a serial number, but there was a definite possibility of that number being misquoted.

And from the traffic office in each area every movement had to be individually recorded and accompanied by the customer's consignment note throughout the entire journey.

The answer to the problem was in putting all the information on to a computer.

It was at this stage that they approached the experts in the field of manufactured attestation for check digit numbering. Roff's Print Ltd of Falmouth, Cornwall.

Roff's Print was the first manufacturing company in the world to produce sequentially numbered weighted check digits, 12 years ago. Previously all source documents check digits had been applied to static numbers, such as account

numbers on cheques, or simpler, less sophisticated systems had been used.

To appreciate the system that has recently been put into operation, it is important to fully understand check digits.

A check digit is a number or numbers bearing a mathematical relationship to a serial number - therefore, when a computer recognises that the serial number and the check digit compare, the information must be correct, within the limits of the system being used. Thus a check digit validates the input information in the computer.

Dependent on that system, a check digit will prevent or at the very least minimise the number of errors.

A weighted system means that each number in a serial number is multiplied by the individual weight. The results are added together and the resultant total divided by the modulus.

The check digit is then either the remainder or the value that has to be added to the remainder making it divisible by the modulus.

In practical usage, 10 and 11 are the most popular moduli. Modulus 10 produces a single figure check digit 0 to 10. See Figure 1.

Within a computer, check digits are constantly used to validate serial numbers.

The problem arises when source documents are used as an input to the computer, and where serial numbers are used as the means of retrieval it is imperative that the source documents also have associated check digits.

This means that the company's own documentation can be used as source documents, either as machine readable documents, key-punched at a video terminal or as more conventional punch card, paper tape, or magnetic tape input derived from the source document.

The advantages of using a check digit system are that it validates the input which is the basic requirement of computer usage, and ensures the correct retrieval of information.

And so it came about that a system, known as Wilkontrol, was first installed by Wilkinson in June 1977. A mainframe central computer, Univas 80/30, was put into the High Wycombe depot and

this is linked to mini-computers in other depots.

Wilkontrol is a push button control system from collection to delivery. Keying the consignment note with its check digit number and details of the consignment into the central computer, gives 100 per cent monitoring and accurate information is obtained in seconds. A continuous check ensures parcels are routed in the right direction, and daily reports are available for delivery details.

This information eliminates split deliveries and gives proof and traffic enquiries immediately. An added advantage of this system is that consistent pricing is automatically carried out, with fully detailed invoices referring to each consignment, thus providing a speedy cash flow.

The information on the check digit consignment note is fed into the central computer via a video terminal. The computer identifies the delivery address and automatically relates the address to the final depot, identifying the route.

Roff's Print considers that pre-verification of

Delivering the goods on time is the prime object of any haulage firm. Yet if such a firm wants more business, the paperwork can often quickly overwhelm it. Wilkinson Transport faced this problem and GILL TURNER of Turner Pitt and Associates describes how it went about computerising its documentation. Out to ensure accuracy it decided to use a check digit system which has virtually eliminated clerical errors.

check digits plays a vital part in its production. The equipment is designed to stop before an error is printed, thus protecting the validity of the information fed into the computer.

A second Wilkontrol system was installed at Higham Ferrers in September 1977, a third at Rochdale in November and a fourth is scheduled for Barking in January 1978.

Serial Number	Weighting	Modulus
1	1	10
2	2	10
3	3	10
4	4	10
5	5	10
6	6	10
7	7	10
8	8	10
9	9	10
10	10	10

13 with a remainder of 3 = 3.D. or 7 = 7.D.

Figure 1

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